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CONTOUR AND CONTENTS OF THE EPITYMPANUM IN RELATION TO SUPPURATIVE DISEASE.*

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The epitympanum while varying greatly in size and shape in different individuals, still possesses certain uniform characteristics which are a guide in the determination of the nature of remedial measures, applicable to diseased conditions of its contents.

For purposes of classification the epitympanum proper may be regarded as a very nearly circular cavity slightly compressed from within outward, and from below upward, its major portion lying posteriorly to the median vertical line of the tympanic cavity, and its walls, in contradistinction to the floor of the tympanum, and the inner wall of the aditus ad antrum mastoideum, being of a smooth and even contour.

The downward and inward slope of the outer epitympanic wall serves to make the bony portion of the epitympanic floor, the remaining space between this and the opposite tympanic wall being partly filled in by the upper surface of the short process of the malleus and the attachments between this bone, the incus, and the outer epitympanic wall, and bridged over by the folds of mucous membrane, with occasionally interposed laminae of fibrous tissue, which are found, to a greater or less degree, in more than 85 per cent. of normal human temporal bones.[1]

It is this main cavity of the epitympanum which is the most constant in its position, size and outline, the greatest variations

(1) Reduplications of mucous membrane in the upper portion of the tympanic cavity. Boston Med. & Surg. Jour., May 30th, 1889, 531. C. J. Blake and W. S. Bryant.

*Read before the meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society.

being those which concern the extensions from this cavity backward and upward in the form of varying recesses in, or encroachments upon, the surrounding diploetic space.

In some instances these encroachments leave a multiple layer of diploetic cells between the tympanum and the superficial cortex of the temporal bone, either inward toward the pyramid, upward toward the tegmen tympani, or backward toward the mastoid, while in still other cases the recesses, apparently joining in the formation of one large pneumatic space, have made the outer cortical layer the only boundary between themselves and the cranial cavity.

With such diversity of contour and such variety in approximation of the superior epitympanic space to the cranial cavity, the question of the speedy outcome of a suppurative process in the epitympanum, in so far as its lethal extension is concerned, would seem to be a matter of considerable dubiety.

It is not, however, until the contents of the epitympanum is made the subject of a careful study, and the possible protective limitation afforded to the progress of a suppurative process is appreciated, that an assurance is apparent, the knowledge of which can be utilized in the prolonged treatment of epitympanic suppuration.

The central, circular, portion of the epitympanum enclosing the larger portions of the major ossicles, bounded posteriorly by the extremity of the recessus incudis and inferiorly by ligamentous attachments and supplementary ligamentous bands, with the addition of mucous folds, becomes almost a cavity by itself, its limited means of communication, with the adjacent parts of the tympanic cavity, being speedily closed in the event of engorgement of the lining membrane.

This engorgement of the mucous, and submucous, tissue, forming the lining of the tympanic cavity throughout, varies greatly in different parts of the cavity and is demonstrable in cases of large perforation, or destruction, of the drum-head, and in cases of destruction of the outer epitympanic wall, the known vascularity of the lining membrance of the upper and posterior portion of the epitympanum favoring a rapidity and persistence of engorgement sufficient not only to compress the retained air in the lower portion of the tympanum and press the drum-head outward, but also to afford a prolonged closure of the aditus and thus still more effectively comprise the epitympanum of pathologic causation,

within the boundary limit, of what may, anatomically, be called the epitympanum proper, the constant space factor, in contradistinction to the extremely variable, and therefore inconstant, space factor beyond it.

Within such an encapsulation a congestive or suppurative process may run its course, its apical outlet being outward and downward through the pars flaccida or through the posterior portion of the outer boundary of the epitympanic space, into the tissues of the upper portion of the membrana vibrans, the remaining portions of the tympanic cavity remaining untouched. Examples of this are to be found in the cases of free serous exudation through the upper portion of the drum-head, accompanying acute congestion, and in the cases in which a carious process of the head of the malleus has run its course to destruction without lateral, or inferior, extension of the suppuration, or other drainage than that afforded by the opening in the pars flaccida. In the initial congestive stage the swelling of the mucous folds, and of the constant mucosa of the aditus, tends to protect not only the underlying diploe, there so extensively present, but to block the major passage backward into the mastoid through the pneumatic chain, of which the epitympanum is the initial member, while in the more advanced suppuration not only the engorgement, but also the proliferative swelling of the soft tissues, serve the uses of limitative protection, and, even where a carious process has been initiated in the major ossicles, or on the outer epitympanic wall, the tendency is to wall the area off from the surrounding healthy structures by engorgement, proliferation, or the production of reparative granulomata.

Examination of the supplementary ligamentous attachments of the ossicles, as well as of the epitympanic mucous folds, shows a tendency to favor drainage of the epitympanum, outward either over the incline of the short process of the malleus or through the posterior portion of the membrana vibrans, in its upper segment, the anterior rounded border of the epitympanic space being above the incline of the tympano-pharyngeal tube and its posterior, antral, portion terminating on a line with the porterior border of the recessus incudis.

The horizontal folds are usually two, sometimes three, in number, one stretches from the anterior border of the tensor tympani tendon forwards and outwards, attaching itself to the anterior ligament of the malleus, and to the anterior wall of the

tympanum just above the entrance to the tympano-pharyngeal tube. Another fold covers over the space between the external ligament of the malleus, the posterior ligament of the incus, the incus, and the external tympanic wall. The least common horizontal fold stretches between the long and the short processes of the incus, the posterior crus of the stapes, and the inner wall of the tympanum.

The vertical folds may be considered as two in number, both suspended from the tegmen tympani; one stretching between the anterior and the suspensory ligament and the other between the suspensory and the external ligament of the malleus. The latter fold is often V-shaped, one arm joining the external ligament, the other arm going obliquely outwards and downwards, joining a horizontal fold near the base of the short process of the incus.

Attached to the posterior side of the suspensory ligament is sometimes found a falciform fold, stretching from the articulation of the malleus and incus, backwards and upwards, onto the tegmen tympani.

The space above the pars flaccida is especially rich in mucous folds. These fill the spaces between the ligaments of the malleus in such a way that there is usually enclosed an irregular pyramidal space with its apex at the suspensory ligament of the malleus. This space is bounded below by the malleus, the pars flaccida, and the external epitympanic wall; above by the soft tissues and mucous reduplications below the tegmen tympani; externally by the upper portion of the outer tympanic wall, and internally by the head, and the anterior ligament of the malleus, and by the vertical fold of membrane stretching between the anterior and suspensory ligaments of the malleus; while it is bounded posteriorly by the external ligament of the malleus and the vertical mucous fold between this and the suspensory ligament.

This space is lined with mucous membrane and often crossed by mucous folds; at its lowest point the pars flaccida meets the short process of the malleus on its upper surface, so that fluid within this space gravitates onto the lower part of the pars flaccida.

The results of the examinations of temporal bones show that in 85 per cent. the space immediately above the pars flaccida is almost wholly enclosed by mucous folds, while in 77 per cent. the epitympanum is partially cut off from the tympanic cavity below it by mucous folds stretching across at least one-half the space.

These enumerated folds, moreover, do not include the reduplications partially bridging recesses in the superior epitympanic space and encroaching upon the lumen of the antrum, folds which, with the more constant mucous reduplications proper, may be safely estimated as more than doubling the vascular surface of the tympanic cavity as a whole.

Investigation, either by section or by transillumination, of the bony wall forming the outer and, partly, the inferior wall of the epitympanum, and coincidently the inner end of the superior wall of the bony external auditory canal shows the reason for the comparative frequency of the spontaneous destruction of this portion of the epitympanic wall in the course of a prolonged suppuration in the epitympanum, with osseous necrosis, where the encapsulating soft structures, engorged and often adherent, have limited extension of the suppuration upward and facilitated the bony destruction downward which most favors the enlargement of the drainage exit from that important direction the posterior extension of the epitympanic space.

In cases of caries of the head and neck of the malleus the destruction of the pars flaccida, and in carious implication of the incus, perforation of the posterior segment of the membrana vibrans, may afford, in themselves, adequate openings both for drainage and for surgical approach, but both drainage and repair may need to be further facilitated by the division of mucous folds and of pathologic adhesions within the area which constitutes the epitympanum proper, as distinguished from the surrounding epitympanic space, and a necessary preliminary to a successful treatment of a limited necrosis within the epitympanum may be not only the removal, by morcellative curettage, or by dry scrubbing, of redundant obstructive granulomata but also the division of folds and bands between the major ossicula and the outer epitympanic wall. This may be easily done by means of the usual angular middle-ear knives, by the curved spatula knife or by the broad bladed mirror knife, cutting being preferable to tearing with a blunt instrument, a ring curette for example, on account of the lesser liability to denudation of bony surfaces still protected and nourished by their normal soft tissues.

The not infrequent clinical presentation of the results of an old suppurative middle ear process, with the membrana vibrans intact, or showing a conglutinate posterior perforation, with an opening above the short process of the malleus, including a portion of the

bony outer epitympanic wall, bounded by involuted cicatrices, dry, clear of congestion and with a fair amount of hearing, is an indication, in what nature has spontaneously effected, of an advisable course of surgical procedure, sufficiently prolonged and patiently pursued.

In the light of structural study and clinical experience the differentiation between the cases of epitympanic suppuration which may be safely treated through the natural channel and those demanding the creation of a new avenue of approach, should be most carefully made and determination should be based upon the merits of the individual case and not upon any merely chronometric estimate.

226 Marlborough St.

A Recent Development of the Radical Mastoid Operation. LOCKHART GIBSON. *Australasian Medical Gazette*, Nov., 1907.

The author gives a short résumé of the stages of evolution of the Radical Mastoid Operation, ending with that latest proposal of Charles Heath of London. Heath's procedure, which, in suitable cases, aims at leaving the drum and ossicles, as well as the bridge of bone over the additus-ad-antrum has his unqualified approval, but he thinks Heath's probes to be needless, even when there is no drum membrane to preserve. And burrs are preferred to chisels and hammer.

Where, however, the ossicles are necrosed, or the walls of the tympanum necrotic, or when the ossicles are bunched up with the remains of the drum in such a way as to be obstructive to the conduction of sound, the thorough and complete Radical Operation must be performed, and in these cases he strongly advises that the after healing be shortened by using Ballance's method of skin-grafting. He makes the statement that after a Ballance operation we may expect the patient to hear up to eight yards, distinct-speech, and that is a successful operation. With presentation of drum and ossicles, we may expect anything up to practically normal hearing.

NOLAN.

THE SIMULATION OF MASTOID DISEASE BY FURUNCLE OF THE EXTERNAL MEATUS AND PERI AURICULAR ABSCESS*

BY H. GRADLE, M. D., CHICAGO.

The diagnosis of furuncles of the external meatus is, as a rule, perfectly plain. There are, however, exceptional instances in which a small boil does not project above the surface. If at the same time there is much pain and swelling over the mastoid process a diagnostic error may occur. The resemblance to disease of the mastoid process is even greater in peri-auricular abscess when there is a collection of pus between the cartilaginous meatus and the antero-external surface of the mastoid bone. These abscesses which have been but little described, may result from the extension of a furuncle or of a diffuse otitis externa. In one of my cases the post mortem showed the abscess to be of peri-tonsillar origin. In some instances the etiology is not clear.

Leutert, (*Arch. f. Ohrenheilk,* 1897, Vol. 43, p. 267), who first called attention to these diagnostic difficulties, laid some stress on the type of fever accompanying peri-auricular abscess not of mastoid origin. In three instances, he found the fever higher and more persistent than is ordinarily the case in subperiosteal mastoid abscesses, while its persistence for a few days after a free incision helps to differentiate the superficial affection from a peri-sinuous suppuration (without thrombosis). For in the latter form of disease Leutert claims an immediate lowering of the temperature after free escape of the pus. Leutert's cases were pus collection secondary to furuncles and contained necrotic tissue shreds, which probably accounted for the degree and persistence of the fever.

More recently attention has again been called to the subject by G. Connal, (*Brit. Med. Jour.,* May 25, 1901, p. 1264). He reports two cases with photographic illustrations showing how post-auricular swelling simulating mastoid periostitis can be caused by furuncles in the meatus and disappear after their incision. His description, however, applies to a peri-auricular abscess.

The following personal observations illustrate some of the diagnostic difficulties which furuncles of the meatus and peri-auricular

*Read before the meeting of the Chicago Laryngological and Otological Society, April 14th, 1908.

abscesses may present in exceptional instances. Their detailed description will render further comments unnecessary.

Case 1. Mr. L., a healthy laboring man, came to the dispensary of the Northwestern University Medical School with the appearance of acute mastoiditis. Three days ago he began complaining of a dull pain behind the right ear, followed by increasing swelling. There had been no history of previous ear disease. The hearing was slightly dulled and the ear felt stuffy. The pain was a dull ache, with great tenderness, but without headache. The auricle stood at nearly a right angle to the side of the face. The mastoid region was very oedematous, but only moderately reddened. The retro-auricular groove was effaced. The swollen region was tender to touch. The meatus was somewhat narrowed by diffuse swelling principally of the posterior wall, however, without redness. The drumhead was pale and normal. His general health was not much disturbed, his tongue slightly coated. The temperature at the time was 101° F.

On presenting him to the class, I pointed out that while he showed the appearance of either a subperiosteal abscess over the mastoid, or a perforating mastoid empyema, that such a diagnosis was not sustained by the history. In the absence of previous middle ear disease an acute mastoid inflammation would be of the nature of an osteomyelitis, more slow in development, and with more intense local pain and more pronounced systemic disturbance. The rapid development and relatively slight disturbance pointed to a more superficial affection, which I took to be an abscess in the areolar tissue between the cartilaginous meatus and the meatus and the mastoid periosteum secondary to an otitis externa. There was no localized swelling indicative of a furuncle.

Carbolated glycerin was instilled for the day. When he returned the following day the abscess had opened spontaneously on the posterior wall of the meatus far inward with free discharge of pus. There was subjective relief and considerably lessening of the swelling. Under a gauze dressing in the meatus complete recovery took place in three days.

Case 2. Miss M., a deaf mute 35 years of age, is said to have lost her hearing during early childhood in consequence of scarlet fever. The lesion was probably an inflammatory destruction of both labyrinths. Both drumheads presented a cloudy and puckered appearance. No details could be learned regarding the for-

mer existence of dizziness. As far as she could remember, she had never had any aural symptoms. On account of toothache, she had had the left upper eye tooth extracted. One or two days later pain began in the left side of the face, extending into and behind the ear. For a few days she was treated for facial neuralgia and as there was no improvement she entered the Wesley Hospital.

When I saw her it was ten days since the extraction of the tooth, and about one week since her pain had begun. The latter had increased steadily in severity, had kept her awake part of the nights, and had necessitated the use of morphine. It was, however, not continuous, but remitting irregularly, and sometimes nearly absent for a short time. It was, localized mainly underneath the meatus and in the mastoid region, but radiated towards the cheek. With it there was some headache, both diffuse, and more especially localized on the left side. It was, however, difficult to get any accurate description from the mute and reserved patient by writing.

The patient felt sick and tired out. Her temperature fluctuated between 99½ and 100° F. The tongue was heavily coated and the breath offensive. These buccal symptoms were probably due mainly to a diffuse pyorrhea alveolaris—presumably of long standing. Nothing abnormal was found in the socket of the extracted tooth. There was no swelling around or behind the ear, but excessive tenderness to touch over the entire mastoid region, as well as underneath the meatus. The sensitiveness extended beyond the mastoid to the occipital bone, and anteriorly beyond the auricle. The symptom most suggestive of mastoid involvement was decided pain on percussing the bone over a distance of several centimeters above and behind the ear. The meatus was not narrowed. About in the middle of the posterior-inferior wall the tenderness to touch by the probe was most pronounced. Yet there was not enough prominence there or anywhere to recognize a furuncle in the walls of the meatus. The puckered and cloudy drumhead was pale. She complained of no unnatural feeling in the ear itself.

Apart from the pain and extensive tenderness there was nothing in the history or symptoms to sustain the diagnosis of mastoiditis which had been made prior to my visit. My own suspicion of a deep furuncle in the meatus was, however, not borne out by examination. On finishing the examination by exploration of the nose and throat another diagnostic puzzle came up. There was

pus in the middle nasal meatus of the affected (left) side, and the immediate suggestion of a maxillary empyema was confirmed on finding the left cheek dark on translumination. It could not be learned from the patient whether the nasal suppuration was of recent date or of long standing, as it evidently had not annoyed her. The left side of the nose, was, however, less patent than normally. The socket of the extracted tooth did not communicate with the antrum.

While I have seen both extensively radiating as well as abnormally located pain in connection with maxillary empyema, it did not seem probable that the maxillary disease could account for the pain, and more especially for the tenderness behind the ear. Carbolated glycerine (10 per cent) was instilled into the meatus and retained by cotton. Antipyrin relieved the pain considerably during the night.

The next day it was found that a furuncle had opened on the posterior wall of the meatus, giving exit to a drop of thick pus. Under a gauze tampon the trifling discharge ceased in four days, and the temperature became gradually normal. The pain subsided slowly, but steadily, being now easily controlled by an occasional dose of antipyrin, but it took several days for the tenderness and pain to cease entirely, even after the furuncle discharge had stopped. The patient declined treatment of the maxillary empyema. All discomfort had left her after the end of the first week in the hospital. Her recovery was permanent.

Case 3. Mr. Z., 30 years old, has had chronic discharge from the right ear since infancy. The drumhead and ossicles are entirely absent, and the hearing is quite dull. Under proper treatment the discharge has always lost its odor quickly and disappeared in the course of weeks or months. But relapses of suppuration have always recurred after an interval of a few years at the longest. The patient having again been cured by me three years ago had staid so for perhaps two years. Since a number of months the discharge had returned, and had been kept under control by the patient himself by means of gauze drains. Since a few days increasing pain around the right ear.

The walls of the meatus were swollen so that no view of the interior could be obtained through the smallest speculum. There was scant purulent discharge with slight fetor. Oedema, with very little redness over the mastoid region. The patient, an ex-

treme neurasthenic, complained of intense tenderness all around the ear. His temperature ranged around 100 to 101° F.

Under the use of carbolated glycerin and firm tamponing with gauze, the inflammatory swelling of the meatus receded moderately. Irrigation through a fine canula brought out no detritus or inspissated pus. As the swelling over the mastoid increased, I made a Wilde's incision on the fourth day under gas on the assumption that this was a peri-auricular abscess. No pus was reached. Three days later the abscess seemed to point in front and just below the meatus. I incised again deeply, but without reaching pus. The pain and distress and temperature had all increased, (the latter up to 103° F). Two days afterwards the abscess opened itself at the external end of the anterior wall of the meatus internal to the tragus. As the symptoms did not subside very rapidly, I enlarged the small spontaneous opening on the next day, whereupon a more decided improvement began. After some ten days the wound had closed, and there was only the scant discharge from the middle ear. But the patient's comfort was again interrupted by acute symptoms with pointing of another abscess over the ramus of the jaw below the meatus. A free incision liberated a few c. c. of pus, and within two weeks everything had disappeared except the persisting slight discharge from the middle ear. The recovery was probably hastened by the injection of staphylococcus vaccine, in view of the staphyloccus found in the pus. The injection was repeated once after an interval of a week. During the following six months the patient had no further annoyance, beyond the slight inodorous discharge from the middle ear.

Case 4. Mr. G., 72 years of age, had previously been under my treatment for marginal keratitis. His health was fair, but the low specific gravity of the urine and slight albuminuria indicated interstitial nephritis. In September, 1894, he complained suddenly of left earache. The pain shifted the next day more towards the side of the neck and the mastoid region. It was not intense, but was accompanied by left sided headache. The third day the pain was mentioned but little by the patient, who was becoming somnolent at intervals. Dr. L. L. McArthur was called in and asked me in consultation that evening. The patient was fast sinking into a depressed condition, being drowsy most of the time. Temperature flutuated between 102 and 103° F. Pulse fast and weak. The patient, when roused, claimed he had neither pain nor headache.

There was a phlegmonous swelling from the region of the parotid gland, extending down the side of the neck a few centimeters below the tip of the mastoid, effacing the retro-auricular groove. The lateral surface over the mastoid was normal, but tender to touch. The meatus was absolutely closed by swelling, and hence the hearing very much dulled in that ear. The left tonsil, pushed inward towards the median line, was pale, but surrounded by oedema.

We concluded that there must be pus in the depth of the soft tissues, without involvement of the bone.

On account of increasing symptoms, Dr. McArthur made a Wilde's incision the following day, liberating pus freely.

There being no improvement, we explored more fully the following day under a very light chloroform anesthesia. There was now an enormous flow of pus from the meatus, which we traced to a sinus in the lower wall leading to an abscess beneath. This was opened freely and packed. The patient did not rally and died the following morning.

The autopsy limited to the exploration of the abscess showed that this originated external to the tonsil, and had penetrated toward and behind the ramus of the jaw. It had burrowed both upward and downward, and had penetrated the lower wall of the meatus between the bony and cartilaginous portions. The mastoid bone, its antrum, and the middle ear, were found healthy.

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Laryngeal and Pulmonary Syphilis; Elimination of a Necrosed Arytenoid; Cure. Dr. RANJARD, DE TOURS. *Bull. de Laryngol., d'Otol., et de Rhinol.*, Oct., 1906.

The author reports an interesting history of a patient, whose laryngeal lesions, as well as general conditions and family history, suggested tuberculosis. The discharge of a necrosed arytenoid suggested the advisability of placing the patient on antisyphilitic treatment. This resulted in a rapid recovery not only of the larynx, but also of the pulmonary affection. SCHEPPEGRELL.

TREATMENT OF SUPPURATION OF THE TEMPORAL BONE OTHER THAN SURGICAL.*

BY GEO. F. KEIPER, A. M., M. D., LAFAYETTE, IND.

That all cases of suppuration of the temporal bone, especially all cases of what we commonly know as mastoiditis, do not need either the simple or radical mastoid operation, goes without saying. In fact, many such cases are cured without such operation. But do not construe this to mean that because many are so cured, all ought to be. They won't.

At the outset let us understand that some of the cases which we see are in such condition that any attempt at other than immediate operation is a reckless waste of time, both for physician and patient. But on seeing a case upon which, after careful examination, we decide not to resort to operation, at least for the present, the question arises, what shall we do?

We shall dismiss that very rare affection, primary periostitis of the temporal bone, and confine ourselves to the treatment of middle ear suppuration, whether acute or chronic, and mastoiditis.

Some general principles of procedure ought to be laid down to cover all these conditions:—

First—The patient demands a thorough examination, both locally and generally. A full history of the case will be necessary. This will determine the general condition. The general condition is of great importance, not only with reference to the cause of the disease, but also with reference to the extension of the disease to other tissues of the body distant from the seat of the primary focus. I have seen cases where suppuration in the temporal bone showed itself elsewhere. A recent case in St. Elizabeth Hospital, this city, had synovitis of the right knee joint, due to pus in the temporal bone.

Second—The physician must always keep in close touch with the patient.

Third—A blood count is of great value to determine, first of all, the number of white cells and the relative proportion of the polymorpho-nuclears; second, the number of red cells, and lastly, the percentage of hemoglobin. This should be made frequently during the progress of the disease.

*Read at the meeting of Middle Section of the American Laryngological, Otological and Rhinological Society, Indianapolis, Ind., Feb. 22, 1908.

Fourth—The microscope must be further used to determine the character of the pus, especially as to the bacteria present therein. For if we find pneumococci, we may feel encouraged to try abortive treatment. The figures of Cunningham, while house surgeon at the New York Eye and Ear Infirmary, show that 90 per cent of cases with pneumococci in the aural discharge recovered without operation, and a mixed infection without streptococci allowed 66 2-3 per cent of recoveries, without operation.

This is quite in contrast with pus showing streptococci; wherein only 14 per cent recovered without operation, and with pus showing staphylococci, there were only 33 per cent recoveries without operation, while a mixed infection with streptococci, only 8 per cent recovered without operation. The rest required operation.

"Under pneumococcus," writes Dench, "are included those cases in which the infective organism was a diplococcus resembling closely the pneumococcus, but not of sufficiently definite character to state positively that they were true pneumococci."

In other words, the examination of the blood to determine the leucocytosis, and of the pus of the ear to determine its bacteriology are essential prerequisites that we may know approximately, if our case has a prospect for recovery with or without operation. The results of the examinations should be communicated, either to the patient, his or her family, or nearest friends or relatives.

Fifth—The pus should be examined for bone dust for that indicates caries.

In otitis media suppurativa acute, the first essential is to secure good drainage through the external auditory canal. If the drum-head is not ruptured, the cause of good drainage will be best served by a free incision in the drum-head posterior to the mallens handle. This will not only relieve pain, but will prevent pus being dammed back into the mastoid antrum to produce necrosis by pressure. Again the nice clean incision will promptly heal, after the pus has ceased to flow, whereas, if nature, after intense suffering to the patient, ruptures the drum, an irregular opening will be produced, which may never heal, besides causing unnecessary deafness to the patient. Then drainage is best secured by the gauze wick carried right down to the perforation. To complete the dressing, the external ear is covered with an absorptive dressing in the shape of a pad of absorbent cotton. When the gauze wick is saturated with pus, it must be removed, the ear syringed and dried, and insufflated with boric acid powder. Then a new gauze

wick is introduced, as was the first one. The pus in the middle ear should have been previously aspirated, not Politzerized.

If pain persists, the application of heat will be very agreeable, preferably by the Japanese pocket stove, which, when properly lighted, will maintain heat evenly for two hours, the degree of which may be regulated by the amount of wrapping around the instrument. This should be tied on the head over the ear. This is better and handier than the Leiter Coil, or the hot water bottle. Morphia should be used cautiously.

The best place for the patient is in bed, in a sunny, warm room, which is well ventilated and clean. The bowels should be opened after this fashion, if the patient be an adult:

℞ Hydrarg. Chlor. Mitis .....gr. ii
Quininæ Sulph .....gr. xviii
M. Ft. cap No. vi.

Sig.: One every three hours until the bowels move. If they do not move within two hours after the last one is taken, then a dose of sulphate of soda or sulphate of magnesium is indicated.

The above will be modified as to dosage according to the age of a child when used on a child.

Attention to the nose and naso-pharynx will also be necessary, and if the patient be suffering from acute rhinitis, the application once daily to the nasal mucous membrane of a solution of the following will be valuable:

℞ Iodin .....gr. v
Potass. Iodidi .....gr. xv
Glycerin .....oz i
M. (Gleason.)

The treatment of Otitis Media Purulentia Chronica will vary with the cause, which may be local or general, or both. If general, it may be due to anaemia, tuberculosis, scrofula, syphilis or la grippe. If local, the discharge may be due to abscess of the external auditory meatus, but most frequently to inflammation of the middle ear and mastoid cells, and less so to polypi.

Hence for constitutional treatment, iron will be indicated for the anaemic; potassium iodide in large doses, and mercury for the syphilitic; for the emaciated quinine and sodium salicylate; for the tuberculous, sunshine and fresh air; nourishing food, with cod liver oil and creosote, and for all, exercise in the open when possible.

For local treatment, the first thing is cleanliness, secured by judicious syringing, with warm, sterile water, followed by careful drying of the parts. If polypi are present, remove; if granulations, use warm alcohol in the external auditory meatus. The warm alcohol is a good cleaning agent in any event. It may be forced into the middle ear by pressing the tragus into the canal completely filled with the alcohol. If the perforation be in syringe point introduced through the perforation. Peroxide of hydrogen should be carefully used, and used only on the applicator to soften and loosen crusts in the external canal. The drying of the parts may be secured by heated air. Powdered boric acid may be blown into the ear, but not in sufficient quantity to obstruct the canal. Richards recommends pyoktanin (one part in nine parts of boric acid), as an insufflating powder, and it seems in the writer's hands to do all claimed for it by its author, though it does discolor the ear and adjacent parts a deep purple, which is sometimes hard to remove even by alcohol.

Again we may use the gauze wick, as in acute suppuration, but with care, for many cases do better with the dry treatment with boric acid powder.

As to drops, the best remedy to use in the middle ear is nitrate of silver in solutions of varying strengths. D. A. Kuyk of Richmond recommends, beginning with a six per cent solution, gradually increased to a 25 per cent solution, to be forced into the innermost recesses of the ear by the Siegel otoscope (Journal A. M. A., 1905.)

For acute mastoiditis, the first essential is free drainage. If the hole in the drum is not large enough, enlarge it by a Graefe cataract knife. If pain is present, relief will be most grateful. It will be best to aspirate the pus, instead of blowing it out by the Politzer method, though by Politzerization, the ear can hardly be more infected than it is. Free drainage will be promoted by the use of the gauze wick as above. The patient should be put to bed and kept there until symptoms have subsided. The writer is partial to the application of two Swedish leeches to the mastoid process, early in the disease. The writer has always preferred heat by means of the Japanese pocket stove. There has been some controversy as to the relative merits of heat and cold, as local applications in this disease; but to my mind, consideration of the Principles of Surgery, which are the principles of all surgery, local as well as general, settles that point. Cold certainly contracts

Shrapnell's membrane, the syringing must be done with a delicate dilated inflamed blood vessels, but while doing so, locks up in the tissues the bacteria of suppuration present, and does even more harm by reducing the vitality of the parts. The worst cases of abscesses of the brain seen and operated upon by the writer have been those where cold was used as a local application. Note further, that cold is advised to be used only twenty-four to forty-eight hours. What we want in these cases is not stasis, but diapedesis, and as McGuire (*Virginia Medical Semi-Monthly*, Nov. 4, 1900) writes in his "Principles of Surgery," heat acts by soothing the sensory nerves, thus diminishing pain; by drawing blood to the surface, thus acting as a derivative; by favoring of collateral circulation, thus relieving stasis and by liquefying exudation and hastening either its absorption or conversion into pus."

The preference is for the Japanese pocket stove applied day and night, until symptoms abate, or until no apparent improvement ensues. There is no indications for removing it after forty-eight hours, as in the case of cold.

Morphine is contra-indicated, because it masks the symptoms so that it becomes impossible to tell whether the patient has local tenderness. It produces a false security, which leads the patient to believe himself better when he may be worse. The heat will, in the great majority of cases relieve the pain and tenderness. For sleeplessness, chloral hydrate and bromide of potassium or sodium may be used.

Blisters are inadmissable, because they make careful examination of the mastoid process impossible, because the blistered surface feels painful when touched.

Of course these patients do better in bed in a well ventilated, clean room, bright and cheery from direct sunlight.

The bowels must be opened by the calomel purge outlined above. The treatment for the general condition will vary as to the cause, whether it be the exanthemata or la grippe. The temperature and pulse must be taken every three hours and recorded, for this may be the only way we have of diagnosing sinus involvement.

As to the use of the antistreptococcic serum, my experience has been that any case severe enough to warrant its use needs a mastoid operation worse than an injection of the serum.

In chronic mastoiditis, like chronic appendicitis, no treatment seems to be of value save the radical or the meato-mastoid operation.

THE DIAGNOSTIC VALUE OF SYMPTOMS OF THE UPPER AIR TRACT IN RHEUMATISM, GOUT AND DIABETES.*

BY EMIL MAYER, M. D., NEW YORK.

The first and most important relation of the upper air tract in rheumatism is the etiological factor. It is now generally accepted that rheumatism is a disease of the infectious type and that some form of streptococcus is responsible, and there is practical unanimity also that entrance into the system is obtained by way of the mouth through some part of the Waldeyer ring.

The manner of entry is graphically described. The bacteria of health find themselves strongly entrenched in the tonsillar tissue of the ring, faucial, pharyngeal or lingual. The mouth is the "clubhouse" for all sorts of disease germs, streptococci seeking admission. Here is the forkway of food and air, and here, too, are the crypts in the tonsillar tissue where the enemy may become lodged The health germs fight valiantly to throw off the septic ones, and succeed usually, unless reinforcements arrive for the enemy and somewhere a denuding of the epithelium takes place, when a portal of entry is found, the lymph spaces are entered, then the glands, and infection ensues.

Regarding the precise point of infection, there is a difference of opinion, and as the possible prevention of infectious diseases is at issue, it is of the utmost importance that these differences should be here considered by the clinician who sees the acute rheumatism and the acute endocarditis, and the laryngologist who may see the starting point of the infection.

The pharyngeal tonsil has been most thoroughly and exhaustively studied both from a pathological as well as from the clinician's standpoint. Of our own pathologists, Jonathan Wright,[1], J. L. Goodale,[2] and George B. Wood[3] have contributed freely. While among the clinicians there are among our own authors H. A. Hare,[4] C. G. Kerley,[5] P. Marvel,[6] Isaac Adler,[7] K. K. Wheelock[8], A. Jacobi,[9] with a host of others the world over.

Of the recent writers there is an interesting resume by F. Kleiminger,[10] on the significance of the tonsils for the occurrence of the so-called cryptogenetic diseases:

*Being a part of a symposium on this subject presented before the New York Academy of Medicine, April 2nd, 1908.

General affections occurred independent of tonsils in seven per cent of cases. In eighty-three per cent the tonsils caused the general infection.

A. There was a tonsillar inflammation in thirty-five per cent of cases of rheumatism and gout, in forty-two per cent of cases of nephritis, in forty-five per cent of cases of other affections; that is, in forty-one per cent of all streptococcus infections.

Of these the tonsils were in fifty per cent subnormal in size, in forty-three per cent hypertrophied, and in seven per cent otherwise abnormal.

B. Previously existing tonsillar infection with inflammation was found in twenty-two per cent of cases of polyarthritis, in twenty-five per cent of nephritis, and in thirty-three per cent of other affections; that is, twenty-seven per cent of known streptococcus infections.

Of these tonsils showing a previously diseased condition, forty-three per cent were subnormal, forty-five per cent were hypertrophied and thirteen per cent otherwise abnormal.

C. Tonsils not previously infected, though the infection entered by the mouth: In thirty-five per cent of rheumatic joints; in thirty-three per cent of nephritis, and in twenty-two per cent of other conditions. Of these the tonsils were subnormal in seventy-five per cent, in eight per cent hypertrophied, while seventeen were normal in size.

"We must therefore be guarded in our prognosis in the anginas with small tonsils. Inquiry should be made as to previous tonsillar inflammation, and if this exists the prognosis should be guarded. Tonsillotomy should be performed in cases of threatened dyspnea, or when malignant growths occur. Its performance removes an important protector against bacterial invasion."

Charles S. Kiefer[11] on the relation between Tonsillitis and Acute Articular Rheumatism, with particular reference to the Prophylaxis of Post-Anginal Rheumatism, says: "We must differentiate between the cases in which the tonsils are the portals of infection in which rheumatism occurred after an incubation period, and those in which, as is occasionally noticed, the tonsillar disease is a complication of rheumatic arthritis."

In 276 cases of rheumatism, 21.3 per cent had a previous tonsillitis, the period of incubation averaged twenty-nine days; treatment consisted in full doses of saturated solution of bicarbonate of soda and local applications of dry aspirin. The immediate results were

very satisfactory, redness and swelling disappeared rapidly and after twenty hours the patient was well. In two series, sixty patients were treated by this method and as many others with guaiac, tincture of iron and peroxide of hydrogen. In the latter series the duration of the disease was six days, a number had swollen necks and severe general disturbance. Superficial and deep ulcerations of the tonsils were frequent, and in fifteen per cent rheumatism of the joints ensued. In the series treated with aspirin, the average duration was three days. The spread of the affection was much less, there was no general disturbance and no ulceration of tonsils and in no case was the joint affected.

R. C. Brown[12] (The Relation of the Tonsil to Infection and Infectious Diseases), has a most interesting study on this subject. He says:

"Rheumatim is so frequently preceded by tonsillitis that it seems to be a question if there is a specific germ for rheumatism. The soluble poisons or toxins of several different bacteria may, on account of faulty elimination be deposited in the joint membranes and causes arthritis. It is very probable that the tonsil is more bactericidal in its defensive action than it is antitoxic. This would account for the large number of cases of infection which are due to the faulty elimination of soluble poisons.

"The tonsil is anatomically admirably arranged to resist infection; it is continually exposed to the action of pathogenic germs.

When we have an inflammation of the tonsil it is caused by a pathogenic germ which is endeavoring to enter, and the inflammation itself is essentially a defensive reaction. When the resistance is lowered from any cause or the germs are virulent enough to overcome the other means of defense which the tonsil has in common with the rest of the oral mucous membrane, or if the tonsil is wounded, a positive chemotaxis having been produced, there is a lacunar tonsillitis. When a negative chemotaxis is produced, either on account of the virulence of the infection, or from some other unknown cause, there is a general systemic infection without a tonsillitis. When we do have a systemic infection it is either in spite of the defensive reaction, or on account of negative chemotaxis. Finally, the relation of the tonsil to infection and infectious disease is one of protection, and the disease we call lacunar tonsillitis is an example of phagocytosis and is a defensive reaction."

Joseph L. Goodale (Some Considerations Relative to systematic Infection Through the Tonsillar Ring), says: "Our knowledge of

the pathology of the faucial tonsils would render it probable on theoretical grounds, that these structures constitute the most frequent portal of entry of all the pharyngeal tissues. This hypothesis has been confirmed by the post-operative results of a certain percentage of cases." In the history of a case presented by the writer there seems a reasonable ground for assuming that after extirpation of the tonsils, infection of the joints occurred through the lymphoid structures of the posterior pharyngeal wall. It is a familiar experience to us all to encounter cases of acute pharyngitis characterized by reddening and swelling of the pharyngeal follicles without inflammatory manifestations in the faucial tonsil. "There may be a small white spot at the summit of its convexity and this would seem to be similar to the phenomena occurring in acute lacunar tonsillitis.

In the latter there is a development of pathogenic bacteria in the crypts of the tonsils, with formation of toxine which is absorbed into the tonsillar tissues. Through the chemotactic properties of the toxine, emigration of leucocytes occurs from blood vessels of the vicinity of the crypts. These leucocytes, together with desquamated epithelial cells, constitute the white spots seen in simple, acute and proliferative tonsillitis. Where the bacterial toxine is stronger, coagulation of the albumen in the superficial tissue of the crypts occurs with formation of fibrin as a result of which the area of white about the lacunae is widened.

In those individuals whose tonsils have been extirpated, an acute follicular pharyngitis occurs as frequently as before. It would seem to be due to a predisposition for such infection on the part of the individual. While experience has shown that the faucial tonsils are the most vulnerable point of entrance for micro-organisms, and while certain previous alterations in these structures favor such infections, yet we are, nevertheless, impelled to believe that normal lymphoid tissue presents no barrier. Such a belief brings us very directly to a consideration of the part played by the host itself in relation to the pathogenic micro-organisms. Even if on examination the tonsils, as well as lymphoid tissue, appear to be normal, we are not thereby able to say that they have not been in the past points of entrance for micro-organisms. The history of the case would be of assistance. If it is possible to test the opsonic index of the individual with reference to the micro-organisms suspected of etiological relation which have been re-

covered from the throat confirmatory evidence would thereby be obtained."

With evidence such as this, and a very small part of a most extensive literature, we rest the affirmative evidence. On the negative side E. Fletcher Ingals,[13] on The Relation of Tonsillitis to Rheumatism, says, after an analysis of his own cases, that 45 per cent of his cases of tonsillitis have a rheumatic history, but 16 per cent of other affections of the throat and chest also have a rheumatic history so that not more than 29 per cent of the cases of acute tonsillitis can be fairly attributed in any way to the rheumatic poison, and more than half of these are doubtful.

Only 19 per cent of his patients gave a history of previous articular rheumatism, and 18 per cent a history of muscular pains ascribed to rheumatism, 8 per cent of the cases of acute tonsillitis were attended by or immediately followed by articular rheumatism, the same number claimed to have had muscular rheumatism, and in 5 per cent the rheumatic attack immediately preceded the angina.

There is not as yet sufficient evidence to prove that the tonsil is only, or even, the chief portal of entrance for the rheumatic poison. Considering, however, that in all probability acute articular rheumatism represents a mild type of septic hematogenic infection of the joints, there is no reason why the tonsil, with its notorious facility for infection with pyogenic germs should not, possibly even frequently assume the role of an infected wound leading to septic consequences of a systemic nature. These vary in degree and location, and rheumatism is, perhaps, one of the phenomena. The evidence does not justify the belief that inflammation of the tonsil may prevent or take the place of an attack of rheumatism. The statement that the acute beginning of muscular rheumatism is nearly always preceded by tonsillitis is not supported by the history of his cases, in only 2 per cent of which did muscular rheumatism follow tonsillitis; however, in 6 per cent muscular pains that were called rheumatism attended the tonsillitis, though they may have been due to the fever attending tonsillar inflammation.

A. Jacobi[9], in his Presidential Address at the Eighteenth Annual Meeting of the American Pediatric Society, takes up the subject of the tonsil as a portal of microbic and toxic invasion. "In diphtheria, whenever the membrane is limited to the tonsil, there is very little or no glandular swelling in the neighborhood. On

the other hand, if a membrane extends from the tonsil to its neighborhood, or starts at a distance from the tonsil neighboring lymph bodies swell at once. Again, the treatment of this neighborhood shows its effect almost immediately on the swelled glands. That is mostly evident when the seat of the membrane is anywhere in the posterior nares which excel by an immense network of lymphatics. On the other hand, when it covers the vocal cords and Morgagni's fossa, both of which have only a scanty network of lymphatics, there is no adenitis nor any constitutional symptoms. In the so-called pseudo-membranous croup there is no glandular swelling or fever." The anatomy of the tonsil was also presented.

"A surface lesion must always be supposed to exist when a living germ or toxin is to find access. If that were not so, no human or inferior animal could exist under the clouds of microbes, and toxins surrounding us. There is only one exception. Stoehr has shown small gaps between the normal epithelia of the surface of the tonsil. It looks rational, therefore, to admit that when there is merely a surface lesion, though ever so slight, there may be an invasion into the tonsil. When, however, the vessels are exposed to pressure by newly formed cells or tissue, there is no invasion, certainly not beyond the tonsil itself, no ganglionic swelling, no toxic poisoning. It is even rational to believe that now and then, when tonsils, or what is more common, a single follicle becomes inflamed, the very venous obstruction will exert the bacterial influence of the stagnating blood serum." He then quotes freely from Geo. B. Wood's essay on the lymphatic drainage of the faucial tonsils[3], that "he (Wood) takes things too easy. What he sets out to prove he simply postulates. He takes the theory of tonsillar invasion for granted, wisely concludes there must be a sufficient number and calibre of afferent and efferent vessels, and courageously postulates as an anatomical fact what he proposes as a theory.

"A number of facts should be considered in connection with the structure and the absorbing and transmitting power of the tonsil. Its surface epithelium is, according to Stoehr, not uniform, and may admit foreign material without a lesion, thus an invasion into the normal tonsil is possible."

"A catarrh with destruction of epithelium may add to that possibility. The lymph current near the tonsil is less active than that of the pharynx at some distance. There are, moreover, (Labbe),

no lymphatic sinuses around the tonsil. There is a system of closed canals in the follicles which do not open into the connective reticulum. This observation of Reterer is confirmed by Hodenpyl. The external deep surface of the tonsil is covered by a firm fibrous capsule. Still, according to many, there is a lymph communication between the tonsil and at least one gland situated near and below the crossing of the sternocleido-mastoid and digastric muscles. Exposure and many diseases change the surface and the structure of the tonsil. Every new inflammation changes them. New cell infiltration and cicatricial tissue renders absorption less possible. Blood and lymph vessels are compressed and undergo atrophy. That is why in advanced life the tonsil gets harder and smaller, and infections become less. No tonsil remains long in its original condition; and the same deleterous influences will no longer prove effective.

Laboratory injections into the normal tonsillar structure are made under pressure, and prove nothing, or very little, for the unembarrassed organ when in situ, and surely not under pathological conditions. Thus, while the normal infantile tonsil which has not suffered from previous exposure or disease may, or must be believed to permit some invasion into the tonsillar structure, and sometimes even beyond it, microbic invasion through the tonsil is not predominant over that which takes place through the lymph apparatus of the pharynx.

That agrees perfectly with the clinical observation of local toxic affections of the oral cavity, according to which membranous affections limited to the tonsil cause no, or little, adenitis or constitutional symptoms."

Thus, here in brief are some of the opposing views.

It seems but fair to present the reply of Wood[14], who says in a recent letter that "I have not in the least changed my views concerning the importance of the tonsils, not only in local infection, but also in a great many cryptogenic and general infectious processes. The question of tonsillar origin of rheumatism, for instance, is being recognized more and more every day; certain cases which have resisted all other treatment get well after the removal of the tonsils. Personally, I believe that the faucial tonsil is much more important in the etiology of infections than the other tonsillar tissues, because the crypts of the tonsil are so constructed as to favor the retention of organisms and decaying epithelial

cells. To say that the tonsillar manifestations result from an already existing infection makes a very hard knot to be untangled. How does the infection get to the tonsil, and why should it pick out this structure for the localization of pathological processes? If it is of lymphatic origin then the infection must travel against the current, and the glands of the neck must possess a very mysterious sort of latent power, as they show pathological changes subsequent to the tonsillar symptoms. Examples of such would be acute tonsillitis and tuberculosis."

In the recent discussion on this subject of which Goodale's essay, already quoted, was the opening, the consensus of opinion among laryngologists was that the infection did enter largely at least by way of the tonsils. This divergence of opinion existing among serious and earnest workers of the profession should find some mean of settlement, and as a rejoinder, we may present a brief resume of two recent papers.

S. J. Ross[15], The Role Played by the Tonsil in Organismal Disease, says that it has often appeared to him that general practitioners are often apt to overlook the important part played by the tonsils as the points of entrance of organisms in specific diseases. He cites the case of a woman, aged 40, with tonsillitis. Cultures showed streptococci and staphylococci, the former largely predominating; four days afterwards, when the tonsillar symptoms subsided, and she had a rigor a large spleen and a typical endocarditis ensued.

E. A. Tracy[16] reports two cases of acute inflammation of tendon sheaths sequential to acute tonsillitis. Finally, from a recent editorial in the *Therapeutic Gazette* (July 15th, 1907), Hobart A. Hare, editor, I quote in part:

"Recent investigations, combined with clinical studies, have proved again and again that the tonsils in the majority of instances act as an efficient barrier against the entrance of infecting micro-organisms into the general system, and the swelling of these glandular tissues after exposure to certain infections is undoubtedly the result of a battle royal between the resistance of the individual and the parasites which are attacking him.

To remove tonsils which are, to a large extent, healthy, would, it seems to us, remove one of the barriers introduced by nature in the pathway of infection, but chronic cheesy tonsils should always be regarded as areas from which invading micro-organisms may

descend upon the general system of the patient. It follows, however, even if the patient suffers no discomfort in his tonsils, these tissues should be carefully treated, and they may be removed, particularly if they are the only infecting source which can be discovered."

Rheumatism once established, may show itself in the nose, pharynx, and larynx, and distinct rheumatic affection of the crico-arytenoid articulation has been shown to exist.

Laryngologists have frequently made the diagnosis of a rheumatic affection of the upper air passages, then only eliciting a history of rheumatism, and with appropriate treatment cured the patient.

That affections of the upper air passages may cause symptoms of articular rheumatism has been shown by K. K. Whelock, who reports an abscess of the antrum causing symptoms of acute articular rheumatism.

Almost all that has been said regarding rheumatism applies to the condition known as gout, except that in the latter there is frequently a concurrent condition in the nose of a vasomotor type Many of the nasal symptoms subside when treated in the same manner as gout, and these have been variously labeled as due to the lithaemic or gouty diatheses.

Of the relation of the upper air passages to diabetes, a very interesting chapter was presented by the pupils of Leichtenstern[17] of Cologne after his demise, from his observations on this subject, entitled "Laryngeal Disease in the Course of Diabetes," (Laryngitis Diabetica). He notes the difficulties in the way of a diagnosis of this affection by saying that a glance at the host of secondary diseases of the larynx teaches that the laryngologist to be master in his field of work, which, though limited to a narrow field in one sense, yet from a pathological point of view, and especially from an etiological standpoint, covers an immense field, must have a knowledge of many differing acute and chronic disorders, above all affections of the lung, but also of many infectious diseases. He must have a comprehension of neurology, syphilology and dermatology. In a word, must be a thorough physician.

He was led to this statement for the reason that the cases seen by himself had been passed over without a correct diagnosis, which he cannot consider, however, as a reflection on those who had previously seen the patients. He cites four cases, all practically alike, one of which, in brief, may be quoted.

A singer, female, of tall, stately figure, not over stout, complained that her voice was gradually failing. At first she noticed it only in responding to encores, but of late it affected her so that she felt herself unable to continue her vocation. Her sensation was that of dryness, though she never had any inordinate sense of thirst, nor was there any emaciation. Except that her cords looked dry and shining, as though varnished, there was no abnormality to be seen. The urine showed a specific gravity of 1036, and sugar was found amounting to 70.4 grams in twenty-four hours. With rigid diet, the sugar disappeared, and there was a complete return of vocal power.

The condition is spoken of as Xerosis, and occurs in but a small percentage of diabetics, and is an early symptom of the condition, the discovery of which thus early being of great advantage to the patient. Diabetic furunculosis of the larynx occurs among the later manifestations, but is also rare, the writer having seen it twice in 412 cases of diabetes. He never saw a perichonditis to follow this condition, though it may occur. While diabetics are prone to furunculosis, due to the entrance of pyogenic staphylococci, the laryngeal mucous membrane withstands these, and it requires a special vulnerability to permit their entrance. Any acute laryngitis may, however, prove a fertile spot for their entrance, and hence diabetics should avoid a laryngitis.

Phlegmonous circumscribed laryngitis comes suddenly, there is a sharply circumscribed inflammatory process, followed by serous exudate; the oedema is followed by abscess in a few days.

Freudenthal[18], (Diabetic Ulcerations of the Throat), reports five cases of this affection, two of whom died. The third case, with ulcer on the epiglottis and inter-arytenoid space occurring in an elderly man, recovered from his throat symptoms by patient daily treatment of orthoform. In the fourth case an ulcer of the tonsil existed and analysis revealed the presence of diabetes, while in the fifth case the ulcer was on the left arytenoid cartilage.

From this presentation we may conclude: That infection in rheumatism and gout enters the system by way of the mouth, the opinion of the majority being that the chief point of entrance is the tonsil.

That rheumatism may affect as such the nose, pharynx and larynx.

That gout affects the larynx, but most frequently the nasal mucosa. That diabetes may be discovered very early by painstaking examinations in certain laryngeal cases, a late symptom being furunculosis of the larynx and possible perichonditis, and that fatal ulcerations in the throat occasionally manifest themselves in diabetes.

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PRIMARY TUBERCULOSIS OF THE UPPER RESPIRATORY AND ALIMENTARY TRACTS, WITH REPORT OF TWO CASES OF PRIMARY TUBERCULOSIS OF THE UVULA.*

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PRIMARY TUBERCULOSIS OF THE UPPER RESPIRATORY AND ALIMENTARY TRACTS.

Tuberculosis, presenting any phase, in any location, is manifestly of such great interest to the medical profession in general that I shall not apologize for this report of two rather rare and interesting cases of presumably primary tuberculosis of the uvula and soft palate, with a brief discussion of primary tuberculosis affecting the upper respiratory and alimentary tracts, mention of several cases not previously reported, and some deductions relative to diagnosis and treatment.

It is vitally important for us all to know and appreciate fully that primary lesions of tuberculosis may and do appear in these unusual places, with, at first, slight, hardly noticeable symptoms, which subsequently may rapidly increase and then indicate pathological changes that may be the cause of much distress and even death.

Granting, if you please, that the diagnosis and treatment of primary and secondary lesions, caused by the bacillus tuberculosis, in the region of the nose, mouth and throat in the late stages are usually in charge of or under the supervision of capable, skilful men, experienced in diseases of these regions, we must still remember that these lesions, often causing insignificant symptoms, are, in the early stages, most frequently under the observation, advice and treatment of the family physician, not especially skilled in this practice, at just the time when the best results from simple treatment are obtainable, and come to the rhinologist, stomatologist and laryngologist when the apparently simple local condition is so far advanced in its progress toward a most severe ulceration, that any treatment will avail little or nothing more than palliation. The cases which I cite below indicate that it behooves us to always give careful attention and consideration to even the most ordinary

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appearing lesion of the upper respiratory or alimentary tract, that may be evident on just casual examination, remembering that, with no general symptoms, and often with but slight local symptoms, we may have a primary localized tubercular infection, very small in size, with nothing in its appearance to indicate its serious character, that may, if not properly treated, develop and become a large focus of disease, which can not by any means, medical or surgical, be eradicated and may ultimately cause the death of the afflicted individual.

Primary tuberculosis, by which we mean that form of tuberculosis in which the infection is direct, not passing to the part by blood vessel, or lymphatic channel, and more narrowly, with no other tuberculous infection in the same body, as an affection of the upper respiratory and alimentary tracts, is a remarkably rare and unusual condition, when we consider the functions of these parts and the cause of tuberculosis.

Accepting the fact, as demonstrated by Koch, that the cause of tuberculosis is the bacillus tuberculosis, and that this organism is present in man in the most widespread of all diseases, and is the prime factor in disease of animals which are most frequently in contact with man, in as high a per cent as thirty (Osler), we must feel that the cause is very widely disseminated, and appreciate that it is, indeed, wonderful that the infections by air and food are as infrequent as we are led by statistics to believe.

The special function of the upper respiratory tract is to act as a passage for the respired air, and to prepare the inhaled air to pass into the lungs. In ordinary breathing we inhale about one-half a liter of air at each inspiration (Zarniko), and in ten inspirations, according to Hesse, we inhale in sleeping rooms after cleaning 180 germs, and in the same room with no dust flying only 20 germs, and, according to Petri, in stables 414 germs, and in factories at windows 90 germs. In general, then, this will average about 30 germs per respiration, possibly, or 600 per minute, and 3,600 per hour. Observations by Hesse, Spree, Aschenbrandt, Paulsen, Kayser, Bloch, Zaufal, Thompson, Hewlett and others indicate that almost all the organisms that enter the nose in ordinary breathing are arrested by the linings of this organ and of the nasopharynx, and that very few reach the larynx except in forced nasal breathing and mouth breathing. From these facts, it seems surprising that we no more frequently have primary infections of the mucous membrane lining the nose and nasopharynx by the bacillus tuberculosis,

but it can be easily understood why the parts lower in respiratory tract are not more frequently primarily affected. Dismissing the fallacious belief that we inhale millions of tubercle germs at every inspiration, but accepting the fact that we do receive sufficient numbers of the organisms to cause infections of the nose and nasopharynx, why it is that we so infrequently find primary tuberculosis in these regions? Briefly, the beliefs usually advanced are: The extension of the protecting skin well in upon the septum, where as a rule, tubercular infiltration or ulceration first shows itself; the high degree of nervous reflex present in the nasal mucosa giving rise to violent reaction on stimulation, with secretion of watery mucus or sneezing; the presence of the usual amount of mucus, in which the infection is received, and by which it is washed away, or, if the mucus dries, sneezed or blown away, or passed through the posterior nares and expectorated; the germicidal action of the mucus, as demonstrated by Wurtz, Lermoyez, and D. Braden Kyle, which inhibits the growth and multiplication of organisms; the movement of the cilia of the epithelium toward the entrance of the nose, and, lastly, and probably of least importance, the vibrissae at the vestibule of the nasal fossae. Cornet says that, on account of the above-mentioned protections, "the nose affords the worst conceivable conditions for the growth of such bacteria as are not easily endowed with specially active proliferative tendencies, and for the tubercle bacilli particularly." Without question, the presence of abrasions, contusions and wounds on the mucosa of these parts favors the possibility of infection, and, for this reason, the pernicious habit of boring into the nostril with the finger nail or handkerchief, as well as the placing of foreign bodies in the nostrils as is common in childhood, is certainly a cause of abrasions that are an open sesame to the infective agents that may be present at all times, as had been noted by Schmitthuisen, St. Clair Thompson, Kiaer, Rosenberg, Felici and Major.

The upper alimentary tract has for its function the reception of food and drink, with a part of the beginning of digestion of this material, and most unfortunately, in far too many cases, in individuals of bad habits in breathing or those suffering from some nasal obstruction, serves as the upper respiratory tract, as also the receptacle of dirty fingers and foreign bodies in both children and adults. It is needless to remind one that mouth breathing in itself gives the greatest opportunity for infection to occur from the inhaled germ-laden dust, but we must bear in mind that the infection

in these cases is almost always pulmonary, primarily. The thick, resistent, squamous epithelium of the mouth, constant movement of the tongue, lips and cheeks, prohibition of growth of tubercle germs by oral mucus (Cornet), passing of saliva and mucus from mouth into pharynx and esophagus, with the infection, before a focus of low resistance may be infected, all afford protection much greater than that of the nose, so that ordinarily no infection takes place in mouth and pharynx, unless the lining membrane is injured, olthough it has been shown conclusively by Cornet and others that such infection can take place through intact epithelium. Even although areas of irritation and points of trauma are so often present in the mouth and pharynx, making it especially susceptible to infection, when in pulmonary tuberculosis the mouth is constantly bathed in infective sputum, we rarely find even secondary tuberculosis of the tongue, lips and cheeks, and the primary form is obviously most infrequent.

Admitting that inspired air with its contained tubercle germs exposes the nose most frequently to infection, and realizing, as stated above, that the trauma quite necessary to nasal primary infection is very often present, and accepting the results of Hesse's experiments which indicate that the organisms that enter the nose are mostly thickly deposited at the entrance of the upper respiratory tract, and diminish in numbers as we pass lower in the tract, so that we find few organisms in the larynx, we can readily see why primary infections of the nose are more frequent than those of the nasopharynx, larynx and trachea, and why the condition manifests itself as an ulceration or infiltration on the septum usually, occasionally on the lower or middle turbinate. Considering the frequency of septal ulcerations, I am inclined to think that it is perfectly fair to believe that there are often primary tuberculous foci in the nostril that are considered of little importance, and never diagnosed other than as simple ulceration of the septum, being healed rapidly by curetting and application of proper remedies to the diseased area. This may be the cause for the small number of cases of primary tuberculosis of the nose which we find reported, as often only those ulcerations which are not attended properly, and not soon cured, draw special attention on account of their tendency to progress sluggishly or rapidly, as the condition may be. According to Prota, "tuberculosis of the nasal fossa is a very rare condition, and the primary form without pulmonary complication is still more uncommon. Many of the older writers doubted the possibility of

tuberculosis of the nasal mucosa. * * * More recently other authors have admitted that tuberculous ulceration of the nose was possible, but only rarely." In a broad sense, practically all cases of tuberculosis of the nose are primary infections, in that they are direct infections (not by lymph or blood channel), but in the narrow sense, with no other tubercular infection in the body, few of the cases of tuberculosis of the nose may be considered primary infections. Lennox Brown says: "Tuberculosis of the nose must always be conceded to be both rare in circumstance and as a primary or early process," feeling no doubt that practically all nasal infections are direct. Cartaz has collected eighteen cases of nasal tuberculosis, seven under his own observation. Of these a great majority had pulmonary tuberculosis. Chiari cited twenty-one observations of "solitary tubercular tumors in the nose," and, according to Shurly, has published four cases of primary tuberculosis of the nose. Coakley says that a few cases of primary tuberculosis of the nose have been reported and states that the nose is the least frequent seat of tuberculosis of any of the divisions of the respiratory tract. Dionisio, in 1892, found sixty-four cases of tuberculosis of the nose. Farlow has reported two cases of primary nasal tuberculosis. Gradle believes that primary tuberculosis of the nose is occasionally encountered. Hajek collected twenty-seven cases, Heryng ninety cases, and Herzog described twenty cases, his being all primary in origin. Juffinger has written upon nasal tuberculosis, Kafeman has published two cases of primary infection. Knight mentions its rarity and agrees that it may be primary. He feels that the presence of the bacillus tuberculosis in the lesion of the nose presupposes the precedence of abrasion of the mucosa. Mertens, in 1889, described thirty-one cases; Olympitis, in 1890, collected thirty-nine cases; Reidel, two cases, possibly primary; Rethi, one case with no other lesion; Sakolowski and Shaeffer have reported on nasal tuberculosis. E. L. Shurly has never met primary nasal tuberculosis in his practice. Tornwaldt and Willick have made many observations regarding nasal tuberculosis. Without doubt, some of these cases mentioned by different individuals are duplicates of cases appearing in other reports, but I am quite sure that it is safe to consider that certainly one hundred cases of primary tuberculosis in a broad sense have been reported, including those of Sachs, Symonds and Williams, mentioned by Jonathan Wright.

In the nasopharynx, which is not subjected to the trauma that affects the anterior nares so frequently, with the same means of prevention from the infection as the nose, and with a lessened number of organisms on account of the inspired air passing through the nose, but with a better chance of retaining the infection in the crypts of the pharyngeal tonsil than on the relatively smooth mucosa of the nose, it is fairly conservative to estimate that about fifteen cases of primary tuberculosis have been reported, the infection always being in the adenoid tissue in the vault. Dieulafoy was the first to point out that there may be tuberculosis of the nasopharynx, as mentioned by Shurly, and Dmochowski, Fischer, Gottstein, Pluder and Suchanneck have all reported cases of primary tuberculosis affecting the nasopharynx. Tuberculosis of the nasopharynx resulting from coughing in persons afflicted with pulmonary tuberculosis is fairly common, I should judge from statements by Baup, Dmochowski, Frankel, E., Koschier, Lartigau, Lewin, Wendt, Wright and Suchanneck, and Nicoll; Lartigau and Nicoll, from their experiments, believe that primary pharyngeal tuberculosis is much more frequent than is usually supposed.

Primary tuberculosis of the lips is so exceedingly rare that it really merits but passing mention. The reasons for its infrequency are obvious. Eiselberg, Platnikow and Scholtz each report a case of primary tuberculosis of the upper lip.

A few cases of primary tuberculosis of the tongue are recorded, but the condition is very infrequent. I personally have seen one case in which the tongue was affected with tuberculous infection primarily, *we thought,* from a pipe-stem wound. The condition was cured with difficulty after long treatment. I thought I had found another case of primary tuberculosis of the tongue a few months ago, but the condition proved to be syphiloma. Bonzemet mentions a case of tuberculosis of the tongue, which had disease of the lungs eight months later. Capart speaks of a case. Grasser has reported a case in which a tuberculous tumor formed on the tongue at the site of a cigar burn. Laboubene has reported a case with disease of lungs fifteen months later. Mendel has cited a case of lingual ulcer with typical tuberculous lesion in base of ulcer opposite first molar tooth. Schlieferowitsch has added to these two cases of lingual tuberculosis, with no disease apparent in lungs as long as the patients were under observation. Tanturri says that he considers that primary tuberculosis of the tongue is easy

to heal. Knight reports a case of deep ulceration of tongue, diagnosed carcinoma, for which the tongue was removed.

In the oropharynx, if the cases I report were not conclusive evidence of the occurrence of primary tuberculosis, we would have to accept the report of Fairlee Clarke, of the 18-year-old boy, with tubercular ulceration of the roof of the mouth and destruction of the soft palate, with no indication of tuberculosis of the lungs either clinically or postmortem, and consider Isambert's disputed case, in which a young boy had tubercular ulceration of the velum, with no positive signs of pulmonary tuberculosis, although he had scrofula and suspicious rhinitis when he was very young. M. Barbier reports a case of tuberculosis of the velum and tonsils. Bosworth has written that from a practical standpoint primary tuberculosis of the pharynx is not important, although it certainly may occur here, as "in any region of the body"; in connection with tuberculosis of the pharynx, his dictum, "it would seem that a deposit of miliary tubercle in the mucous membrane of the respiratory tract assumes a peculior virulence as the seat of the deposit is in portions near the outer world," assumes considerable interest. Carriere has noted a case of tubercular ulceration in the cheek of a man, not primary in character, although doubless infected directly. Coakley feels pharyngeal primary infection is exceedingly rare, and thinks infection must occur in abrasion. Chappell has reported three cases of tuberculosis of the oropharynx, one of which was primary, in a young woman infected from her sister. The condition ran a rapid course. Inoculation tests were positive, and the tubercle bacilli were found in the sections. Gleason believes pharyngeal infection takes place in an abrasion. Gradle says that the soft palate is more often affected in primary tuberculosis of the pharynx; that the ulceration, when low, causes great pain in swallowing and may cause patient to starve. He feels that diagnosis must be easy, and believes that demonstration of the tubercle bacilli in section makes absolute the diagnosis. In case of doubt in histological examination, he believes that the tuberculin test will determine the condition. Grogler has reported a case of primary tuberculosis, in which the bone part of the palate was affected. Guttmann and Lublinske consider that 1 per cent of tubercular patients have secondary tuberculosis of the pharynx, and remark on the general tendency for ulceration in this region to be regarded always as syphilis. Heinze has found fourteen cases of secondary tuberculosis of pharynx in 1,226 cases of pulmonary

tuberculosis. Kessler has reported a case of primary tuberculosis of the palate and pharynx. Knight says, referring to primary tuberculosis of the pharynx: "Primary cases have been reported, but there is always a suspicion that a deep-seated or limited lesion in the lung may have escaped detection." Kussner has reported a case of palatal infection, not primary. Levy, from a large experience in Colorado, has found that about 1½ per cent of cases with pulmonary tuberculosis have pharyngeal lesions. In his experience, the course of pharyngeal tuberculosis has been very rapid, terminating in from three to four months. Morelli mentions a case of primary tuberculosis of the mucous membrane of the gums and cheek. P. Schoetz has reported a case of probable primary tuberculosis of pharynx. Scheh, according to Lennox Brown, has been forced to the belief that the pharynx is affected with primary tuberculosis only apparently, and Brown is in accord with this belief. Shurly says he has met but one case of primary tuberculosis of the walls of the pharynx and back part of cheeks, which were sprinkled with little nutmeg-colored nodules, which by amalgamation broke down into ulcers. Newcomb believes that the uvula and soft palate is most frequent, and that primary tuberculosis occurs in the pharynx in 1 per cent of all acute tubercular infections. He says that it is not necessary that there be a solution of continuity of tissue for infection, as, according to Strauss and others, infection may take place through intact mucous membrane, and in a recent number of the Laryngoscope he calls attention to acute tubercular infection of the pharynx, which on inspection might be easily mistaken for diphtheria. Sleicher has reported a case of primary infection of the pharynx, while E. Sokolowsky has found no case. In 1,307 autopsies Williglk found one case only affected with pharyngeal tuberculosis. Unkerman has reported a case of primary tuberculosis of the velum.

The tonsils seem to be quite frequently affected with tuberculosis primarily. I am rather astonished to learn that Robertson says that "8 per cent. of patients presenting for nose and throat symptoms exhibited primary tuberculosis of the faucial tonsils." The cause for the frequency of infection is the open, deep crypt, which receives and cultivates the infecting organism. Shurly, in his complete treatise, "Diseases of the Nose and Throat," gives some little space in his chapter on tuberculosis of the upper air passages to tuberculosis of the tonsils, and believes that the "reports of Dmochowsky, Hannan, Kafeman, Moritz-Schmidt, Schech, Schlenker and Strassman would indicate that tuberculosis of the tonsils is a common

accompaniment of pulmonary phthisis, and that it is very often overlooked." He states, further, that Botey, in his experiments with guinea-pig inoculations, came to the conclusion that there exist certain forms of amygdalitis or hypertrophy of a primary tuberculous character, impossible sometimes to positively distinguish from the common hypertrophy of these organs, with which every one is familiar. Wright says that he is inclined to agree with Hoedenpyl that tuberculous tonsillitis is rare, and that the tonsils are seldom the seat of primary tuberculosis, according to Shurly. Shurly says that he has never met with a case of primary tuberculosis of the tonsil, although his observations cover a long period of time and include the observations of several thousand cases of various forms of tuberculous disease. In a search of the literature I find that Abraham, Hopkins, Koplik, Kruckmann, Orth, Ruge, Sacaze, Schlenker have all reported cases of primary tuberculosis of the tonsil, Koplik mentioning three.

Primary tuberculosis of the mouth and pharynx together has been reported by Gleitsman, who cured the case. Morelli and Stark each mention one case, in which tubercle bacilli were found in carious teeth, with no tubercular lesion in the body.

The inspired air is so well freed from the inhaled organisms by the nose and nasopharynx, the air passes with such rapidity through the larynx, and the protection of the mucus and mucosa is such that primary tuberculosis of the larynx is considered impossible by many, improbable by some, but an actual condition by those who have reported cases, and their followers. It is interesting to note some of the views about primary laryngeal tuberculosis. Lennox Browne, in a discussion on Tuberculous Laryngitis, says: "That evidence of the tubercular diathesis influences a local laryngeal inflammation in a manner eminently characteristic, and at a period long prior to the discovery of equally well-marked symptoms in the lungs, is a fact which the daily observation of those engaged in laryngeal practice establishes as incontrovertible. Whether or not there is tubercle actually developed in the larynx, or what, indeed, is the nature of tubercle wherever developed, the author does not presume, and indeed, does not care, to decide. Seeing, however, that tuberculosis is a disease primarily manifesting itself more especially in the respiratory organs, seeing that catarrh is one of the most frequent excitants to that disease, and that many catarrhal inflammations of the lungs commence in the larynx, it is at least fair to infer that, in those cases in which the eye reveals

what has come to be recognized as tuberculosis laryngitis before the ear detects the presence of tubercle in the lungs, the disease has primarily attacked the former organ." This was written in 1877, and twenty years later the author seconded his early opinion by saying: "We may, therefore, for the future, consider tuberculosis of the larynx as a primary disease." In 1881, with Dundas Grant, Lennox Browne prepared two papers to which I have referred elsewhere.

Coakley says: "A few cases of well-authenticated primary tuberculosis of the larynx have been observed, but the majority of supposed primary tubercular infections of the larynx show within a few weeks marked evidences of pulmonary involvement. It is always a matter of doubt whether the condition of the lungs is secondary to that in the larynx or whether, as we believe to be the more common, the evidences of pulmonary tuberculosis were at first so slight as not to be detected on physical examination." Knight, without any question in the matter, says abruptly: "Tuberculosis may attack the larynx primarily or secondarily; in the former case, the process is usually acute; in the latter, chronic. Primary tuberculosis of the larynx is believed by some authorities to be not very uncommon, and is thought to have certain distinguishing characteristics. Twenty-nine cases of primary tuberculosis of the larynx have been reported by Aronsohn, three of which are authentic, in seven the coincident pulmonary lesion was limited and believed to be secondary, while in nineteen the diagnosis of primary laryngeal disease was based solely on clinical signs, which, of course, can not be accepted as conclusive." D. Braden Kyle, in his reference book, "Diseases of the Nose and Throat," discusses primary tuberculosis of the larynx as follows, referring to the lodgment of the bacillus of Koch in the laryngeal structure as the essential factor in this condition: "Whether this be a primary condition arising from infection drawn from without the body, or whether it is always a secondary manifestation from a pre-existing pulmonary consumption, has long been a theme for discussion. With Cohen and others, the author believes, however, that primary infection of the larynx may occur. This view is fully sustained both by theoretical considerations and by postmortem examinations." Newcomb writes: "There is no longer any doubt that tuberculosis may primarily affect the larynx, though many of the cases placed in this category do not present sufficient evidence to exclude the possibility of the existence of some other local deposit to which the laryngeal affection is sec-

ondary. So far as the writer knows, no case of laryngeal tuberculosis has ever progressed to a fatal termination without evidence of invasion of other structures, though autopsies have sometimes shown the larynx invaded, but the lungs free." Shurly states, in his work to which I have referred several times: "Tuberculosis laryngitis may occur as a primary or secondary affection. Much discussion has taken place upon the question of its *primary* origin, but it must be admitted that it often develops primarily." Wright adds interest to this discussion by saying that "the larynx is by far the most common seat of tuberculosis of the upper air tract, and it is, as a rule, if not always secondary to or associated with pulmonary tuberculosis. . . . This view of laryngeal tuberculosis being always secondary is held by almost all observers, and is proven by the findings of autopsies, there being very few recorded cases of death by laryngeal tuberculosis where pulmonary involvement has not been found. The opponents of this view are very few in number, the most prominent of them being Dr. Gleitsman of New York, whose researches have been extensive, and who reports two cases of primary laryngeal and pharyngeal tuberculosis in his own practice, which were cured. In the report of his cases[1] he quotes Demme, E. Frankel, Pogrebinski, Orth, Coghill, J. S. Cohen, Dehio and Lancereaux in support of his view." He believes it impossible to prove the presence of primary laryngeal tuberculosis without autopsy. He has seen many cases of tubercular laryngitis which he thought were primary, which proved to be combined with pulmonary affection.

I find that de Renzi, Frankel, Josephsohn, Massucci, Orth, Panzer and Trifiletti have reported cases of primary tuberculosis of the larynx, as has also Demme in a child, 4½ years of age, who died of tuberculous meningitis, and on autopsy was found an ulceration of the larynx with tubercle bacilli in it. Boylan, Cadier, Dehio, Fischer, Jones, Jullien and Neidert have described apparently primary tuberculosis of the larynx. Capart mentions a case of primary tuberculous infection of the tongue with later involvement of the larynx. Tanturri cites one interesting case, in which he made a diagnosis of primary tuberculosis of the larynx, with secondary involvement of the tongue, and cites another case of primary tuberculosis of the tongue, with death resulting from tuberculosis of the larynx.

The only recorded case of primary tuberculosis of the trachea is that of Valette.

1. Journal of Tuberculosis, April, 1901.

No primary tuberculosis of the esophagus has been described, and the secondary form is exceedingly rare, occurring most easily from without.

PRIMARY TUBERCULOSIS OF THE UVULA.

The history of Case 1, which I obtained from the patient, his family physican and a surgeon who operated on him for rectal fistuia, is as follows:

Case 1.—The patient, Mr. J. G., of Irish parents, 43 years of age, married, postmaster, and residing in the northern part of Michigan, presented himself for examination of his throat, which, he said, was badly ulcerated. Mr. G. had been married many years, and had a wife and four daughters living, all in excellent health. His wife never had an abortion or still-born child. None of his relatives ever had any diseases bearing on his condition.

Previous to June, 1900, Mr. G. had always been in excellent health, but at that time he was troubled with a rectal fistula, which was operated upon in a hospital in the State of Michigan. The surgeon who operated on Mr. G. for this fistula informed me that, at the time of operation, he found "an ulcerated growth up the rectum which did not heal kindly." This ulcer, he was reminded by the nurse who assisted him, he thought possibly to be malignant, but remembers nothing about there being any throat complication in G.'s case which required attention. While Mr. G. was convalescing at the hospital he noticed "a reddening on one side of his throat, which afterwards became a pimple." A little later the other side became affected similarly. The discomfort occasioned by the irritation of the lesions on his taking acid drinks was sufficient to cause the patient to call the attention of his physician to it, and by treatment the condition was alleviated and improvement took place. The condition was of such slight interest that no record was made of examination or treatment of Mr. G.'s throat at the hospital. The patient soon left the hospital and attention given the throat was discontinued.

In June, 1902, the patient noticed another sore throat, with a papular lesion on his uvula, similar in appearance to that which he had noticed in his throat previously. This was treated, but not until other papules formed in contiguous tissue, opened and ulcerations resulted, which coalesced and spread over the uvula and on the soft palate. This condition was treated systematically and locally by his family physician, who, regardless of the negative history, suspected syphilis and gave Mr. G. potassium iodid and biniodid of

mercury internally, and gave peroxid of hydrogen and borolyptol gargle, with silver nitrate applications locally. It is of interest at this point to note that the patient applied for and received life insurance September 1 of this year, in the examination for which

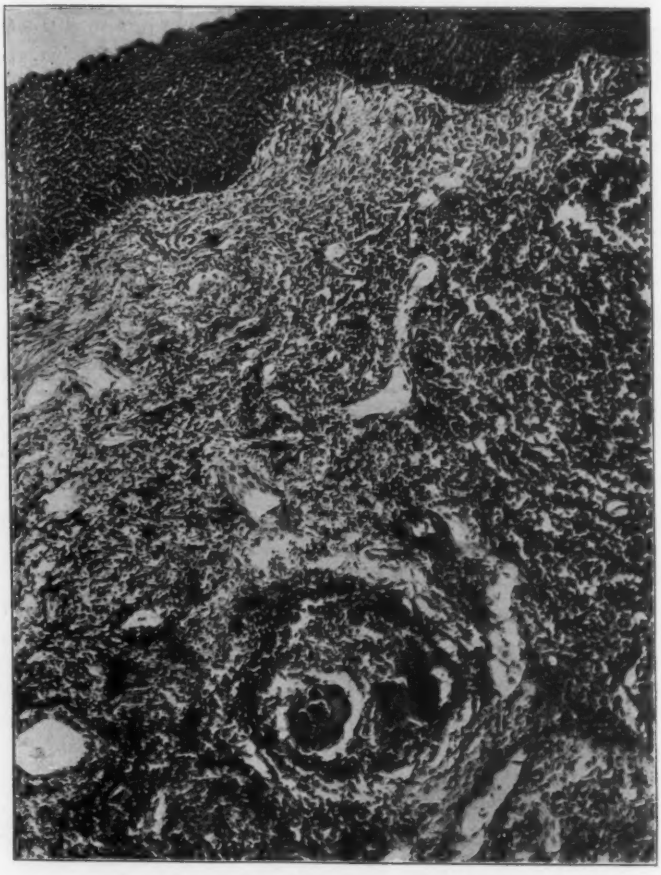

Fig. 1.—Portion of uvula from Baldwin's case. Subepithelial tuberculosis. Epithelioid nodules with caseous centers and containing giant cells.

he stated that he had been attended by a physician within the last two months previously on account of ulcerated sore throat. He was recommended by his physician as a good risk, and was granted a policy, which was afterward contested, I believe.

The treatment that G. had been receiving seemed to interrupt the rapid extension of the disease but for a brief period, and then it appeared to be getting so much worse that his physican advised him to go to Ann Arbor and enter the University Hospital.

Patient came to the hospital Nov. 20, 1902. He complained of sore throat that caused constant pain, great annoyance on account of the discharge from the ulcerated focus, and inability to eat anything but liquid food, and that with great discomfort. Further questioning brought out a firm denial of even a possible chance of syphilitic infection, and a statement that every physician who had seen his throat had asked him if he had ever had syphilis; and, knowing that in order to obtain help for his condition, he must disclose all points bearing on his case, he could only assure me that he had never subjected himself to any chance for venereal infection.

The pathological macroscopical appearance of the ulceration of the mouth was noted for me by Dr. Warthin, who described it as follows: "The posterior half of the hard palate extending to the alveoli at the sides is indurated and thickly set with small miliary nodules, more or less aggregated into larger papilloma-like masses, and covered with a rather firmly adherent, dirty yellow or grayish pus-like exudate. Anteriorly and at the sides there is a gradual transition to normal mucous membrane, but small miliary nodules are found scattered some distance from the edge of the main lesion. Laterally, the ulceration extends in some places over the alveoli, and a few small nodules are present on the buccal mucous membrane. Posteriorly, the free edge of the soft palate is thickened, ragged and indurated, and presents numerous miliary nodules, a few as large as a split pea. The surface appears ulcerated and is covered with the same grayish exudate. The uvula is long, greatly thickened and indurated, its surface ragged, ulcerated and set with small nodules. A few of the nodules are as large as a pea. Near the base there are many miliary nodules. The pillars of the faucea, the tonsils and the pharyngeal wall are not involved. "Dr. Warthin examined the patient and found nowhere on his body any indication of lupus or tuberculosis.

My examination showed that the nose, pharynx and larynx were free from disease, and that the pillars of the fauces, the tonsils and the tongue were not involved.

The points in the history noted, and the appearance of the diseased part, regardless of the specific treatment administered, and the firm denial by the patient of syphilitic infection, lead to the

diagnosis: (1) syphilis; (2) epithelioma; (3) tuberculosis; the preference being in the order named. This diagnosis was concurred in by several clinicians; one suggesting that he would consider simple epithelioma first, and another believed it appeared like lupus-

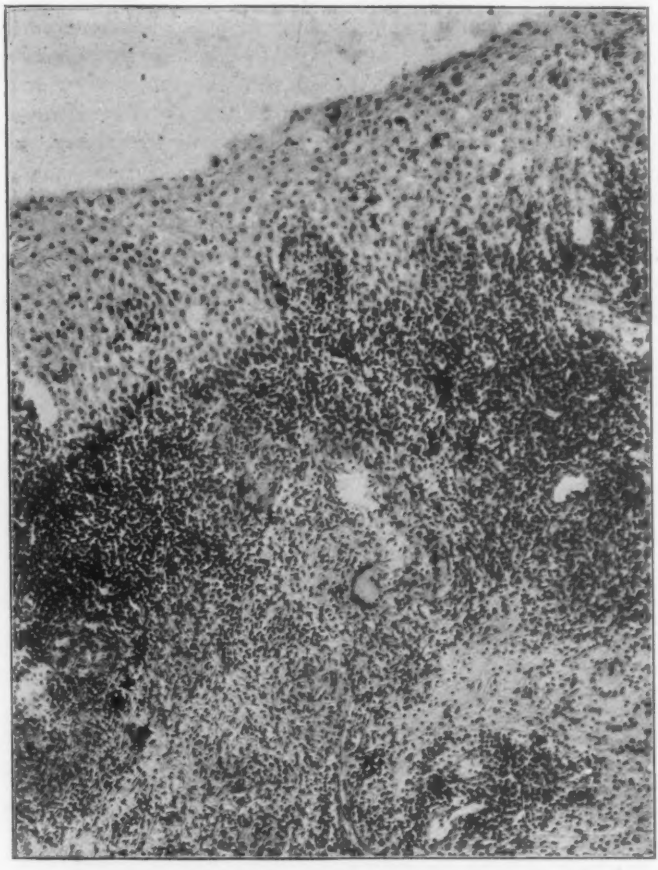

Fig. 2.—Portion of curetting from roof of mouth. Subepithelial tuberculosis (lupus), Case 1.

epithelioma, rather than syphilis. Curettings from the diseased area sent to the pathological laboratory for histological examination were reported upon by Dr. Worthin as follows: "Bits of tissue removed from roof of mouth for diagnosis show a characteristic

appearance of tuberculosis. May be syphilis, however, I have not had time to stain for bacilli. No evidence, in the part examined, of neoplasm." A second report on the tissue, a few days later, read: "This tissue shows everywhere a subepithelial tuberculosis; a papillomatous growth. Only in one place is there evidence of caseation change." A still later report of the curettings was as follows: "Further examination of specimens from this ease shows everywhere a subepithelial tuberculosis, though bacilli have not yet been found. Over the tuberculous granulation tissue is a hyperplastic epithelium, a papillomatous growth; in every way the picture suggests the appearance often found in lupus, namely, a lupus-papilloma. Only in one place is there any suggestion of epitheliomatous change, and this appearance may be explained by transverse and oblique cutting of the papilla; but, inasmuch as epithelioma often develops in skin lupus, such changes may occur here, although not yet found. The possibility of a so-called lupus-carcinoma must be borne in mind. (A rare and very interesting case.)"

In the meantime I presented the case, one evening, to the members of the University Hospital Clinical Society, suggesting the possibility of the condition being primary tuberculosis, and the interest manifested made it imperative to determine whether the condition was primary in this unusual locality, or secondary to other lesions, especially in the lungs. So at my request Dr. Dock made a thorough physical examination of Mr. G., and gave him a test with tuberculin to determine whether there were any pulmonary lesions of incipient tuberculosis and to see if the patient would react locally or generally to the tuberculin. The physical examination was negative, as was also the examination of the sputum. The tuberculin test was neither absolutely positive nor absolutely negative. To 1 milligram of tuberculin given November 29 we noticed a very slight rise of the temperature to 100.3 on November 30, and I was informed that the patient's throat felt a little better. To 5 milligrams of tuberculin given December 1 we noticed a slight rise in temperature as before to 100.4 and a slight frontal headache. The patient told Dr. Dock that his throat felt a little more sore than usual, but it showed no local reaction. To 10 milligrams of tuberculin given December 5, we noticed a slight headache, with increased soreness in the throat possibly, but no local reaction. The last reaction, if we may call it a reaction, was less apparent than the others, possibly due to an immunity being conferred by the first injections. The tuberculin test, then, may, with reason, be considered doubtful.

Dr. Nancrede examined the patient's right wrist for a swelling present and reported "tenosynovitis, possibly tubercular."

Dr. Carrow concurred with me in my examination and negative findings in the nose, pharynx and larynx.

Fig. 3.—Low-power view of part of transverse section of uvula of Case 1. Sub-epithelial tubercles. Tubercles also scattered throughout deeper tissues of uvula.

At this time, as the condition had spread further, getting worse even under drastic treatment, I removed the patient's uvula and sent it to the pathology laboratory, and also sent material to the bacteriology laboratory for inoculation and culture tests. The

inoculation and culture tests were all negative, possibly on account of the small amount of tissue sent to the bacteriologist.

The results of the clinical, histological and bacteriological examinations to this time had not given conclusive evidence that the condition was tuberculosis, although it was evident that, whatever the condition was, it was primary in the location of the uvula. Special stains made by Dr. Warthin for the determination of the presence of the bacillus tuberculosis were reported upon as follows: "Tissue removed from the roof of the mouth. Fixed in alcohol, embedded in paraffin, and stained in hematoxylin and eosin. On section there is found the picture of a subepithelial tuberculosis, small nodules of epithelioid tissue without blood vessels, and showing more or less central caseation and containing characteristic giant cells. The connective tissue about the epithelioid nodule is infiltrated with leucocytes and there is a more or less extensive fibroblastic proliferation, causing a lengthening of the papillae. As the result of such lengthening, there are areas of epithelium apparently extending into the connective tissue. Such appearance may be explained by the cutting, and there are no evidences of malignant proliferation of the epithelium. In some places, the surface epithelium is entirely gone, and the surface of the section consists of a mass of epithelioid tubercles, without ulcerating or caseating areas. Many sections were stained for tubercle bacilli with carbol-fuchsin, but without success. Later a few beaded bacilli were found in the caseated areas. A diagnosis of tuberculosis (lupus) of the mouth may be given, considering the clinical history, apparently a primary condition of the uvula and roof of mouth."

A similar report on the examination of the uvula was as follows: "The uvula was fixed in mercuric chlorid, embedded in paraffin, stained in hematoxylin and eosin, carbolfuchsin and methylene blue. Transverse sections were made of the entire uvula. The epithelium for the greater part is intact, but in a few areas is entirely gone. In some places it is very thin, the superficial loyers being absent. Beneath the epithelium and extending entirely around the uvula, there is a zone of epithelioid tubercles, the majority showing caseous centers and containing characteristic giant cells. Some of the nodules are confluent. The tissue about the tubercles is more or less infiltrated with small round cells, and shows a fibroblastic proliferation. The neighboring blood vessels are congested and have thickened walls. Smaller tubercles are scattered throughout the uvula, even in the muscle. The process, however, is pre-eminently

a subepithelial tuberculosis. The areas denuded of epithelium present a surface of epithelioid tubercles, in part caseating. In sections a few beaded bacilli are found in the caseous areas."

Besides operative measures to remove the diseased tissue, we used the customary local applications to alleviate Mr. G.'s suffering and

Fig. 4.—Subepithelial tubercles with beginning caseation and containing giant cells. Portion of uvula. Case 1.

to try to prevent the spreading of the ulceration, but to no purpose; in fact, our efforts in his behalf did not seem to improve the condition, and he steadily grew worse, the ulceration spread, and he

rapidly lost weight and strength, so he returned home on December 22, as we considered his case to be hopeless.

On January 28, G.'s physician wrote that since returning home the patient's condition seemed to improve somewhat for a few weeks, which he accounted for by his pleasure at being with his family again; but that this apparent improvement had been but temporary, as he had recently been growing perceptibly weaker and was suffering more pain. He further stated that the ulceration on the roof of the mouth especially had healed quite well, though the surface was broken by pedunculated masses the size of a pea; but posteriorly, and in the region of the tonsils and pillars and upon the alveoli, there was evidence of a spreading of the condition as an open ulcer, covered with a creamy pus exudate. Another communication from G.'s physician, dated March 12, said: "G.'s case is completed. He died February 24 at his home. For about three weeks he suffered from motor paralysis, gradually extending up legs and thighs and body, abdominal muscles and arms, so that the patient was helpless for the last four or five days of his life. Sensation was decreased, so deglutition was easier, and sensibility of mouth, palate and pharynx was diminished. The ulcer seemed to spread along border of gums, down to larynx, trachea and esophagus. His voice was very hoarse, and frequent attacks of coughing brought up enormous quantities of yellow, blood-tinged mucus, almost purulent in character, very difficult to expel toward the last. Gradual failure of strength, impeded respiration, with muscular twitchings, and occasional periods of suffering marked the end. The pulse ran to 150 the last hour, temperature 1 to 2 degrees above normal to subnormal just before death; respiration gradually lessened, with increasing rales, till patient's death. The privilege of an autopsy was denied."

Case 2.—The history of Case 2. I obtained from Dr. D. Braden Kyle of Philadelphia, who, in answer to my inquiry regarding his experience with tuberculosis primary in the region of the uvula and palate, stated that he had seen one case. This case Dr. Kyle courteously allows me to report with the history of the case I have just detailed. In two communications received from Dr. Kyle he says:

"I have seen a number of cases in which the pharynx and tonsillar folds were involved in tuberculosis secondary to the pulmonary lesion, but I have only seen one case of primary tuberculosis of the uvula and soft palate. The ulceration, which was proven to be tuberculous by microscopic examination of the secretion and scrap-

ings from the part, began on the soft palate and uvula, as near as I could obtain from the history, involving both structures when first noticed. There were no pulmonary symptoms until eighteen months later, when a slight lesion was discovered in the right apex. In the

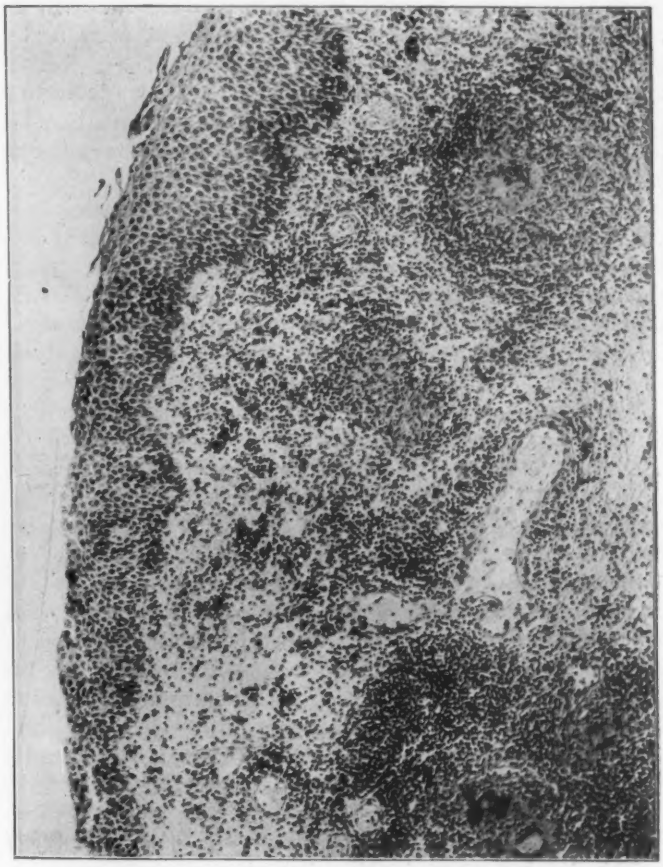

Fig. 5.—Section of nodule from uvula of Case 1. Subepithelial tubercles, infiltration, etc.

meantime the tuberculous lesion had involved the pharynx and later the epiglottis and larynx. The patient was at once sent to Colorado and died six months later. I think that primary lesions of the uvula and soft palate are, indeed, rare, although I think primary

lesions of the larynx are more common than is generally supposed." In answer to my request for further data, slides and any additional information regarding the case, Dr. Kyle wrote: "I did not make any inoculation tests, either in animals or test-tubes. The microscopic examination of scrapings showed so clearly and distinctly the tubercle bacilli that I did not think it necessary to make further investigations. Unfortunately I did not retain the slides, but the microscope fields were filled with tubercle bacilli and by contrast stain showed many other bacteria present. Personally, I have not the slightest doubt as to the diagnosis, although it was not confirmed by the tuberculin test or serum cultures."

In a careful examination of the literature on the subject of primary tuberculosis of the uvula and palate, I find one undoubted case, reported by Baldwin as "tuberculosis of the uvula" in his article, "Some Unusual Localizations of Tuberculosis." Baldwin's exhaustive examination of the literature up to the time of this report failed to reveal any case reported in which the uvula had shown tuberculosis. To quote from his paper: "Although tuberculosis of the pharynx and larynx is of common occurrence, I have been unable to find any case reported where the uvula has shown any tuberculosis. This case, then, is unique in that it is one of the first, if not the first, case of tuberculosis of the uvula." Baldwin gave me personally a brief description of this case and the findings as follows: A woman, aged between 50 and 60 years; good family and personal history, with no evidences of tuberculosis, came to Dr. Carrow for a small nodule on the uvula, which was removed and proved to be chronic granulation tissue (tubercular). The uvula was then removed *in toto* and examined. Microscopically, just beneath the mucous membrane was a granulation tissue very poor in blood vessels. Deeper in the parenchyma of the uvula were small masses of epithelioid tissue containing no blood vessels. Scattered through these masses and making up a large part of some of them, giant cells, with peripherally arranged nuclei, were found. Sections of the uvula stained with carbol-fuchsin showed a few tubercle bacilli in the giant cells and in the other epithelioid tissue."

I wish to lay especial stress upon the fact that this patient, whose history Dr. Baldwin gave me, at the last report was alive and well, with no indication of having ever suffered with tuberculosis of the uvula.

Dabney reports having seen "one of the rare cases of tuberculosis beginning in the upper part of the throat." He says that he has

seen certainly two cases and possibly one or two others. In his reported case, he found the lesion confined to the roof of the mouth, a typical ulceration causing considerable pain and interfering with the patient's nutrition. Examinations of the scrapings from the ulceration were negative, the diagnosis being based then on the macroscopical appearance. Examination of the patient's chest by several physicians failed to reveal pathological condition of the lungs till ten days before death, when a deposit in the apex of one lung was discovered. In answer to a letter from me, Dr. Dabney wrote me that he had seen another case, unquestionably tuberculosis, apparently primary, with this history: "The patient was a youth, about twenty, whose mother had died of tuberculosis when he was an infant. Her trouble is said to have begun in the throat, probably laryngeal. In the young man's case, before any symptoms could be detected in the lungs, there appeared a worm-eaten ulceration on the soft palate, gradually extending over its surface and down upon the pharyngeal wall. It was attended with great pain in swallowing, steady loss of weight, and a temperature ranging from normal to 103 or more. The appearance of the patient was typically tubercular, and micrscopic examination confirmed the diagnosis. He was sent to Asheville, N. C., but steadily lost ground and died within a few months after the first evidence of the disease appeared."

Lennox Browne has described a case of secondary tuberculosis of the uvula with an accompanying illustration, which has been largely copied in other text-books.

Grunwald, in a personal communication, referred me to his "Atlas and Epitome of Diseases of the Mouth, Pharynx and Nose," in which there is a good illustration of tuberculous lesion of mouth and hard palate, which from the history of the case is doubtless a secondary infection to a possibly primary nasal lesion, "the infection probably traveling from the floor of the nose by way of the lymphatic clefts of the incisive foramina."

Ingals several years ago wrote me that he never had seen either primary or secondary tuberculous infections of the uvula, nor primary of the palate, but had seen secondary infections of the palate and fauces.

Knight wrote me that he had observed several cases of tuberculosis involving the uvula and palate by extension from the pharynx, but no case in which these regions were primarily the seat of tuberculous infection.

D. Braden Kyle in his excellent work, "Diseases of the Nose and Throat," says that ulceration of the uvula occurs as a primary infection in tuberculosis. The tuberculous involvement may appear as small, wart-like excrescences which go on to ulcerations, so arranged that a peculiar club-like formation is given the uvula.

Moussous has reported a case of primary tuberculosis of the uvula, tonsils, and anterior pillars of the fauces.

Phillips, after mentioning that primary disease of the uvula is rarely seen, states positively that lupus does not primarily affect the uvula, but papillomas are occasionally seen, being usually dependent upon syphilis or tuberculosis.

Prota reports a case of primary tuberculosis of the nasal mucous membrane, with secondary involvement of the uvula and soft palate and pharynx. He says in part: "The uvula was in part destroyed. The soft palate was infiltrated with small miliary nodules which were roughened, rose colored and slightly translucent." I note that Prota's bacteriological tests were negative, but that he obtained a positive tuberculin reaction. Although the microscopical examination here was proof of the condition being tuberculosis, he points out the difficulty of diagnosing tuberculosis from syphilis, even microscopically, mentioning the fact that is only eleven of twenty-seven cases of tuberculosis of the nose were tubercle bacilli found.

Sir Felix Semon some time ago wrote me that he had never observed a case of undoubted primary tuberculosis of the uvula and soft palate, but without referring to his case books he would say that he had seen about twenty cases of secondary infections of these parts in thirty years' experience. I was unable to get a copy of his communication to the Laryngological Society of London on "A Case of Obscure Lardaceous-looking Infiltration of the Uvula," etc.

E. L. Shurly wrote me that he had seen one case of primary tuberculosis of the uvula, which spread thence to the lymphatic system of the lungs. He had in mind no case in which the condition was confined to the palate alone, but had seen several cases where this region was involved.

Swain, in a long experience, a few years ago, had not seen any cases presenting tuberculosis, either primary or secondary, of the uvula or soft palate.

Treitel has reported a case of primary tuberculosis of the palate.

Wright has reported a case of primary tuberculosis of the uvula and pharynx.

From the fact that Birkett has mentioned in his report of the case of primary lupus of the pharynx that "the pharyngeal aspect of the uvula shows two distinct nodular infiltrations, each about the size of a lentil, the mucous membrane covering these being quite intact." I have reserved the mentioning of this case until I described affections of the uvula, not wishing to discuss tuberculosis and lupus. Birkett says: "What is necessary in all cases of this nature is to establish the circle of evidence, namely, presence of the tubercle bacilli; definite results from inoculation; and, I think one may say, the reaction from the use of tuberculin." The bacilli were found; inoculations were positive, as was also the tuberculin test.

CONCLUSIONS.

Primary tuberculosis of the upper respiratory and alimentary tracts is not such a common condition that we can generalize or draw many conclusions from the relatively small number of cases reported, and the few that we may meet in our own personal experience. We can not help but note that many of the presumably primary infections are at some time later disproved by indications of previous or concomitant general infection, or local infection which must have been overlooked at the time of earlier examination, on account of its presence being undemonstrable. The concensus of opinion is that these infections appearing in the upper respiratory and alimentary tracts, whether primary or secondary, are very severe, and run their course in a short space of time, but that if seen and treated early in their course the chances for cure are good.

These lesions are not especially easy to diagnose, I am constrained to say, from my experience with the case whose history I have given, as the clinical picture of tuberculosis is much like that of syphilis or neoplasm. This clinical picture not being characteristic enough to prove the condition either tuberculosis, syphilis or neoplosm, we must rely upon the microscope to differentiate by histological structissue, or demonstration of the organism in culture medium or aniture of the tissue, presence or absence of organisms in the examined mal inoculation tests. Personally, the fact that the bacillus tuberculosis is found in the removed tissue is proof positive to me of the nature of the condition. The only practical clinical test, to my mind, is the thorough pushing of antisyphilitic treatment, although I am well aware that many feel that the tuberculin test is infallible in its demonstration of the presence or absence of tuberculosis, but

often the course of such infections is so brief that the test by treatment would be unwarranted, to say the least.

Could our old friend, Aretæus, the Cappadocian, have had in mind primary tuberculosis of the upper respiratory and alimentary tracts when he wrote, in 50 A. D., "The postponement of medical treatment is a bad thing, for by procrastination they pass into incurable affections, being of such a nature that they do not readily go off, if they once attack, and if protracted by time they will become strong and end only in death"?

When we consider the prophylaxis of primary tuberculous infections of these regions, we must have in mind the factor in prophylaxis of tuberculosis in general. I am fully confident that we often err when, in our converse with tuberculous patients, we do not continually keep before them the fact that they are a menace to all those with whom they come in contact, or even those who may never see them or know them, providing they do not attend properly to the prevention of the spreading of their infection. As at present, tuberculosis is only theoretically preventable, and for obvous reason will not be practically preventable for some time, it is necessary for us to consider the prophylaxis largely from the point of the condition of the locality affected and those things that are liable to increase the chances for such infection. Dismissing as not feasible, then, the general prophylaxis of tuberculosis, we must expect the presence of the bacillus tuberculosis in the inspired air of practically every individual at some time during the day, and plan, if possible, to prevent the organisms, which must be present practically at all times in the nasal and oral mucus, from infecting the membrane itself, by proper attention to nasal and oral hygiene, and by the correction of any local or general conditions which may determine these particular regions as an easy avenue of infection.

Children and adults should be instructed that danger lies in careless picking at the nose to remove the little crusts that may accumulate in the nares, and that the nose should receive as careful attention in its daily treatment and care as any other part of the body. Mouth breathing should be corrected. Foreign bodies should not be put into the nose and mouth. Promiscuous osculation should be abandoned. The use of public eating and drinking utensils should be limited. Whenever slight chronic conditions of hyperemia of the mucous membrane exist, they should receive the attention of the physician, who only should advise the douche or spray or gargle that may be needed. If all this were carried out, the result would

be that systematic and complete and careful examinations of the upper respiratory and alimentary tracts would be made at regular intervals, and any suspicious conditions could be investigated at an early date.

Although none of us will hardly agree with our preceptor, Galen, who, in 140 A. D., said: "Ulcer (ἕλκος) of the lungs was less frequent than ulceration of the larynx and trachea," we must believe that ulcerations and other affections of the upper respiratory and alimentary tracts, caused by the bacillus tuberculosis, are sufficiently frequent even as primary conditions to merit the careful consideration and attention of all the men who are working toward the common end of alleviation of pain and suffering, and, better still, the prevention of those conditions that couse pain and suffering and even death.

I wish to acknowledge with thanks the assistance rendered me in the preparation of this paper, by direct help in the attention given the patient when he was in my care, or by laboratory work with the examination of material from the patient, or clerical assistance in investigation of the literature on the subject of primary tuberculosis, of the following of my colleagues. Drs. Frederick Baldwin, Fleming Carrow, George Dock, Charles B. Nancrede, Aldred Scott Warthin, A. W. Wilkinson, D. Braden Kyle, and those from whom I have received personal communications. In preparation of the paper I have consulted freely the text-books mentioned in the table of references, Nothnagel's Encyclopedia of Practical Medicine, Index Medicus, Index Medicus Novus, and various journals of medical science.

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A CASE OF SUB-GLOTTIC PAPILLOMA CURED BY LARYNGO-TRACHEAL FISSURE.
A CASE OF BRANCHIO-GENETIC CYST.*

BY THOMAS J. HARRIS, M. D., NEW YORK.

I.

Sub-glottic tumors are among the most difficult to treat and demand at times all the patience and skill that the surgeon has at his command. The following case is reported, not because it is in any way unique, but because of the unusual complications which it presented in diagnosis and treatment and with the hope that the experience gained may prove of service to some one in a similar case.

Ralph D., age 11, came under the writer's care in the Manhattan Eye, Ear and Throat Hospital last October through the courtesy of Dr. Charles A. Manson. The following history was obtained. He had suffered from measles and pneumonia, but otherwise had always been well. The family history was negative. The present trouble with his throat began in January, 1907, when his voice became hoarse and he noticed that he easily got out of breath. There was no pain in phonation and no expectoration of sputum or blood. The boy had been for several weeks attending the Tuberculosis Clinic of the Department of Health, where it was suspected that the condition might be tubercular because of a temperature which he was running. His health was, however, good and the examination of his chest negative.

Inspection by us showed a rather anaemic lad who spoke with considerable hoarseness and effort. A view of the throat was rendered difficult by an overhanging epiglottis, as well as by its pronounced irritability, leading on the slightest manipulation to repeated vomiting. The cords were seen to be healthy. On phonation, a tumor was visible, filling the anterior commissure and attached to the under surface of the right cord. This growth appeared to be solitary, red in color and not vascular. A number of attempts were made to remove it endo-laryngally. On account of his extreme timidity, crying at the least examination, this was found impossible. On October 15 he was admitted to the hospital

*Read by Title at the 30th Annual Congress of the American Laryngological Association in Montreal, May 11-13, 1908.

and an attempt was made to do this under ether through the Jackson tube-spatula. Although it was easy to expose the tumor to view and to engage it in the seizing forceps, it was found that they were too light to remove more than a small portion of it. This procedure had a favorable effect on the breathing and voice. Without, however, waiting for suitable forceps, it was determined to perform a laryngo-fissure and remove the growth from without. Preliminary to this tracheotomy was deemed advisable. This was performed under general anaesthesia on November 18. Before we were ready to open the trachea, the boy stopped breathing and it was necessary to stab him through the crico-thyroid membrane. On account of the excessive oozing the removal of growth was delayed for a few days. A tracheotomy tube was introduced and the boy sent back to the ward. Marked reactionary swelling in the larynx took place and all laryngeal breathing was cut off. A week later Dr. Chevalier Jackson was kind enough to examine the larynx and trachea by the direct method. The growth was to be seen, but so surrounded by inflammatory swelling, involving both the vocal cords and the anterior wall of the larynx and trachea, that he deemed it unwise to make any attempt either by the inner or outer route to extirpate it till the reaction had subsided. This course was followed and the lad kept under observation. The laryngeal swelling gradually went down and he was again able to breath per via naturalis. Much apprehension was felt lest a permanent cicatricial deposit should be left, seriously interfering with normal breathing. At the end of two months, however, the oedema had virtually disappeared and, what was more surprising, careful examination failed to show any trace of the tumor remaining. The landmarks in the larynx were still distorted and the cords showed much swelling. It was therefore felt advisable, after consultation with Dr. W. Kelly Simpson, to introduce an intubation tube and remove the tracheotomy tube.

This was done February 10, 1908, and excellent breathing secured. This continued for about ten hours, when suddenly he began to find great difficulty in getting his breath. He was again readmitted to the hospital and the tracheotomy tube reintroduced. The intubation tube could not be seen in the larynx, and was discovered in the stool the next morning. He was again intubated, this time with a smaller tube. This tube gave equal comfort and remained in situ for four days. When I again saw him, four days later, he was breathing perfectly, but the thread had been bitten

off and there was no trace of the tube to be seen in the larynx, nor was it ever found. Inasmuch as the respiration was so good, we decided not to reintroduce the tube, but merely to keep him in the hospital. This was done for two weeks, when he was allowed to go home. The voice, which was at first very hoarse, has continued to improve and when last seen, April 18, was clear and quite strong, considering the injury which the larynx had sustained. Laryngeal examination showed the cords assuming their normal color and outline. The boy had gained in weight and appeared to all intents perfectly well.

A review of the case suggests the following interesting points: 1. The misleading effect on the diagnosis of the two symptoms complained of, viz., hoarseness and dyspnoea, which taken in connection with fever caused a suspicion of tuberculosis. This was readily cleared up as soon as a laryngeal examination was made, which had apparently been omitted up to the time he came to us.

2. The second point that impressed itself on us was what is being so generally recognized at present, viz., the practicability and usefulness of the direct method for removal of laryngeal growths, especially those situated sub-glottically or in children. We are confident that the tumor in this case could easily have been removed at the time of the original examination with a proper Mosher forceps, and thus all the danger and annoyance of the subsequent external operations avoided. The experience in this case and in other similar cases which we have seen and read of has served to demonstrate to us that the brilliant work of Killian abroad and Jackson among others in this country in the direct inspection of the upper air passages is applicable not only to foreign bodies in the trachea and bronchi, but also to the removal of benign neoplasms in the larynx itself.

3. The third point that was brought to our attention was the *danger* in cases of laryngeal obstruction due to new growths, of interference with the respiration during the tracheotomy and the *profound reaction* which may follow the hasty opening of the windpipe thereby necessitated. What was the cause of the respiratory failure here, it is hard to say. It did not appear to be due to the anaesthesia. It may have been possibly due to the mass falling into the chink of the glottis. There did not seem to be any wounding of the cords at the time of the operation, but it is evident that this had occurred.

4. Still more interesting was the way that this oedema and what looked like adhesions entirely cleared up. To all that saw the case it seemed inevitable that a web would be the permanent result of the inflammation. What existed and was taken to be a perichondritis was chiefly oedema or otherwise it would not have disappeared as it did.

5. But most remarkable of all was the *total disappearance of* the *tumor.* Without any other treatment, solely under rest secured by means of the tracheotomy tube, every vestige vanished. This is, of course, no new observation. It, however, serves to confirm the value of this classical treatment for laryngeal papilloma, which this growth, in all probability, was.

6. Reference is to be made, too, to the *loss* of the *intubation tube,* an accident which has doubtless occurred many times, but which is none the less suggestive of dire consequences.

7. Finally, mention should be made of the surprisingly *good voice* which resulted. When seen at the height of the reaction, it did not seem possible that he could ever recover at the best more than a hoarse voice.

II.

The second case is reported merely for its extreme rarity and not because it possesses any particular clinical interest. Up to 1904, when Dr. C. G. Coakley reported before this Association an extremely interesting case of bronchio-genetic cyst of the throat, there was no record in the literature of such a condition having been discovered in that locality. His case presented many symptoms of unusual interest which, for a time, obscured the diagnosis, and which are described at length in his paper. The present case can in no way be compared with this in any of its clinical aspects.

The history is as follows: I. N., aged 30, married, born in Russia, presented herself at the clinic of the Post-Graduate Hospital last January. She was the mother of three children. Family history negative. She denied any previous illness or accidents. She stated that she had no symptoms of nasal difficulty up to five months ago, when she began to be troubled with a feeling of discomfort in the naso-pharynx and dropping of mucus especially at night, when she felt, as she expressed it, "all stopped up."

Examination of the throat showed what appeared to be a mass of adenoids in the naso-pharynx. The nose was clear. A more careful examination by means of the finger gave the sensation of

entering a cyst with thickened walls and filled with a tissue resembling an adenoid. The posterior wall was covered by a membrane measuring at least a quarter of an inch in diameter. No secretion of any kind was seen. The growth was removed by my colleague, Dr. Forbes, with the forceps and a specimen submitted to the pathologist for examination.

Dr. Erdwurm made the following report: "Sections show tissue to be made up mostly of lymphadenoid structure; one surface shows the normal stratified squamous epithelium of the pharynx. There are a few mucous glands, and scattered through the section, in several places, are tubules lined with ciliated columnar epithelium. Beneath this epithelium the tissue has the appearance of embryonal connective tissue, and from these characteristics the tissue removed is evidently the remains of a branchio-genetic cleft."

The specimen was also kindly examined by Dr. Jonathan Wright, who confirmed the microscopic diagnosis. Dr. Wright made the following report: 1. The surface epithelium here is everywhere metaplastic, *i. e.*, the columnar walls on the surface have everywhere become of the pavement type. Except where the surface is turned into a protected depression, where these depressions or sulci are cut across the epithelial cells are seen to be not only columnar but ciliated. This is the more marked because some of the metaplasia has gone to the point of the flat epithelium assuming intercellular bridges or presenting the appearance of so-called stickle cells.

2. There are not the usually well marked germ centers here that are characteristic of lymphoid hypertrophy.

3. There are patches of spindle-celled fibrous tissue not predominant enough to warrant suspicion of sarcoma, but more prominent than usual.

4. In a few areas of chronic inflammation there are atypical giant cells, apparently arising from the fusion of the cytoplasm of some of the large mononuclear lymphocytes of which in these regions there are many.

The clinical history of the case subsequent to the operation is uninteresting. All symptoms of obstruction disappeared and the patient was discharged.

117 East Fortieth Street.

A CASE OF PRIMARY CANCER OF THE EPIPHARYNX.

BY GOTTLIEB KIAER, M. D., COPENHAGEN, DENMARK.

The claim of this case for publication is its rarity. In 1897, Kroenlein[1] had collected 900 cases of cancer, with sixty-one cases of carcinous pharyngis; but among these only two had their primary seat in the epipharynx.

The patient is a laborer, sixty-four years old. Previous to the present time, he had always been well, except for difficulty in hearing in his right ear. He denies syphilis. During past year he has been treated for difficulty in hearing by inflation and local applications in the naso-pharynx. The condition was not improved. On the contrary, the hearing in the sound right ear became impaired. There were strong pulsations in the right ear, and a few times pricking pains darted from deep within the ear outward. At the same time the glands of the throat began to swell, first on the right side, later on the left. The patient became emaciated in spite of an excellent appetite, but he was able to work. In addition to the swollen glands and darting pains, in the last three months there has been severe right sided headache.

The patient is strongly built, but spare and with a slightly yellowish complexion. On inspecting the oval cavity, the soft palate is seen to be very much flaked with red; the whole pharyngeal mucosa is red, swollen and covered with yellowish mucus, especially on the posterior wall and in the vault. Anterior rhinoscopy shows nares of normal proportions, with good air passage. Sense of smell was acute. On the right side the cervical retromaxillary, parotid and submaxillary glands are enlarged to the size of hazelnuts or walnuts. They are only slightly sore. On the left side the condition is the same, but in a less degree. The larynx is normal. The rest of the examination revealed nothing abnormal.

I immediately concluded that the condition was one of malignant lymphoma. The greatly swollen cervical lymph glands, the comparative health of the patient in spite of his emaciation, and the slight paleness of the mucous membrane pointed in that direction. However, it was not until my next examination that I found the reason of the marked glandular hyperplasia. By posterior rhinoscopy there was seen in the vault of the pharynx an elevated, flat,

dirty ulcer, with ragged and wall-like edges. It occupied all of the right side of the vault and extended a little past the median line and a little down on the posterior wall. I could not determine the exact consistency of the ulcer, as the distance was so large, and the upper front teeth were not missing. A piece was removed by biting forceps for microscopic examination. Dr. C. Riis reported as follows: "In the connective tissue spaces are seen abundant growth of numerous large cells irregularly shaped, separating the normal groups of round cells. In a few places there are indications of extension of the surface epithelium into the depth."

To be on the safe side, potassium iodide and mercury in increasing doses were prescribed, and at the same time the patient was subjected to Roentgen ray treatment at St. Joseph Hospital. Later electrolysis may be tried, but with only a small current, for fear of destroying the wall of the pharynx.

The dense network formed by the lymph vessels in this region, Waldeyer-Bickel's ring, easily explain why the glands are affected on both sides of the throat and especially on the right.

The microscopic examination showed typical cancer and the chemical picture, a man of sixty-four years, with a large, dirty, flat ulceration, with swollen, precipitous edges and inflamed surroundings, enlarged glands, severe pains radiating to the ear, is that of a carcinoma. Nevertheless, potassium iodide and mercury were given in increasing doses and Roentgen ray treatment was used possibly to alleviate the severe radiating pain and right sided hemicrania.

This treatment has been continued for three weeks. The ulceration has become clean, the mucous membrane in the pharynx is less red and swollen, but for the rest, the condition is unchanged.

I will not advise operation, and would not even if the glands in the throat were not so much swollen. Loeb (*The Laryngoscope*, 1902, p. 910), has collected all the cases published of primary carcinoma in the epipharynx, altogether thirty-nine, and in no case did an operation succeed in curing the patient.

The prognosis is pessima. Morphine alone can help the patient over the violent pain and headache that develop when the pain spreads to the cancer cranii.

A CASE OF INTRANASAL SARCOMA.*

BY H. AUFMWASSER, M. D., CINCINNATI, O.

The following case of malignant disease of the posterior nares offers some points of interest, especially in connection with the treatment which was followed, showing the value of the Roentgen rays as auxiliary agents in the surgical treatment of malignant disease.

Mrs. S., aged thirty-two, was referred to me September 12, 1903, on account of an infection of her nose. Patient had been well up to six weeks prior to the date mentioned. She began to suffer from severe headaches and was unable to breathe through the right nostril. There was no history of lues or tuberculosis. Inspection of the right nostril showed it to be filled with a hard growth which was found to be an enlarged, cystically degenerated middle turbinated bone.

This was removed by means of the snare, the operation being followed by instantaneous relief of the occluded condition of the right nostril. The headaches disappeared and the patient left for her home in Kentucky, apparently well. Six weeks later she returned with aggravated symptoms. The anterior part of the nose was found to be filled with a mass which was attached by a broad base to the anterior third of the floor of the nose. This mass bled easily upon even slightest manipulation. It looked like a granular tumor and was removed by means of the galvano-cautery snare, the patient making a prompt recovery. There was no glandular enlargement in the contiguous parts. Microscopic examination was not made. In January, 1904, patient returned, complaining of severe headaches and general malaise and suffering from frequent hemorrhages from the again occluded right nostril. Examination showed the field of the last operation as well as the remnant of the middle turbinated bone to be clean and uninvolved. At the junction of the middle and posterior third of the floor of the nose a spongy growth was found extending upward.

On account of enlargement of the posterior end of the inferior turbinated bone, no rhinoscopic view of the tumor could be obtained. There was no discharge from either frontal sinus or antrum. Examination of the urine was negative. Under cocain

and adrenalin anesthesia the growth was removed by means of the cold snare and the base curetted. Bleeding, which was very profuse, was finally arrested by means of a post-nasal plug and nasal tampon. Microscopic examination by Dr. A. O. Zwick showed the growth to be a typical round-celled sarcoma. Patient came back two months later. Examination revealed a recurrence of the growth at the previous site. Again the growth was removed by means of snare and curette, the operation causing the patient to nearly collapse from loss of blood. On March 22, the patient was referred to Dr. O. Juettner for X-ray treatment.

The technique was as follows: Patient was placed in a reclining position, the head drawn backward. The whole face was covered with sheet lead. An opening was made in the lead corresponding to the location of the opening of the right nostril. A small speculum-like tube made of sheet lead was secured in the opening, exposing the interior of the right nostril. A moderately low tube was placed in front of the lead-speculum at a distance of about ten inches. In this position the patient was exposed to the rays for ten minutes at each sitting. The X-ray exposures were given every other day for three weeks. By the middle of May, 1904, the condition of the patient was found to be good, no recurrence having taken place. Six weeks later a small elevation was noticed at the site of the two last operations. Patient felt well and would not consent to any surgical intervention. In September, 1904, she came back with occluded right nostril. Examination revealed the existence of a firm growth which did not bleed readily. The tumor was removed amid considerable hemorrhage. Pathologically the tumor was the same character as those previously removed. For two weeks X-ray treatment were given every other day. The patient returned home in good condition. She was seen in November, 1904, and her condition found to be satisfactory. There was no recurrence, the sites of the previous operations being closed with firm, cicatricial tissue. The last report from the patient was received November 1, 1907. Her condition continues to be good. There is no recurrence of the local trouble.

113 West Seventh Street.

REMOVAL OF DISEASED TONSILS AND ADENOIDS TO RID THE THROAT OF DIPPTHERIA BACILLI.

BY JOSEPH B. GREENE, BIRMINGHAM, ALA.

The following report of removal of diseased tonsils and adenoid to rid the throat of diphtheria bacilli is, so far as I have been able to learn, the first recorded case. No laryngologist would think of operating on tonsils or adenoids during an acute attack of diphtheria, but after recovery, and while temporary immunity is present, it would seem a favorable time for operation. The following patient was brought to me for treatment because diphtheria bacilli were found in the throat by the health authorities, which furnished good cause for exclusion from the public schools.

Patient O. R., a boy of eight years, who had usually enjoyed good health, except for frequent attacks of sore throat, and symptoms of "mouth breathing," consulted me Nov. 13, 1907, on account of the persistence of diphtheria bacilli in his throat. Two weeks previously he had had an attack of diphtheria and was given 4,000 units of anti-toxine. Tonsils were enlarged and adherent. The crypts were open, and the tonsils showed signs of chronic inflammation. Palpation of naso-pharynx showed considerable adenoid tissue present. Patient was given a spray of bichloride of mercury, 1 to 5,000, for throat, to be repeated every four hours. Five days later another swab was taken from the throat, which showed almost a pure culture of diphtheria bacilli. Appreciating the danger of the patient to himself of having a recurrent attack of diphtheria, and the danger of infecting other members of his family, which was a large one, to say nothing of the disadvantage of being kept away from school, I advised the removal of the tonsils and adenoid. The tonsils were freed from the pillars by the Leland knife, and enuclueated by the wire snare. The adenoid was removed with a curette. Immediately after operation the patient was given, in order to increase his immunity, 2,000 more units of anti-toxine. The patient's recovery was uneventful. At no time was he more ill than patients usually are after such operations. His temperature never went higher than 100° F. Nov. 30th, nine days after operation, a culture made by the health authorities showed entire absence of diphtheria bacilli.

It would seem to me that as far as the danger of another attack of diphtheria was concerned, in this case, there was less than in operating on diseased tonsils when diphtheria had not occurred. It is a well-known fact that diphtheria bacilli are present in a fair proportion of cases when children have shown no evidence of diphtheria, especially is this the case at times of local outbreaks of this disease.

On account of the temporary immunity conferred by an attack of diphtheria, there should be no more risk incurred by operating after an attack of diphtheria than at other times. One must not overlook the visceral changes, especially of the heart muscle, occasioned by the diphtheria infection. This should influence the operator in the choice of an anaesthetic. Chloroform should never be used, and the heart should be carefully watched if ether or ethyl bromide be the choice. Nitrous oxide gas is too short in its effect for use in an operation where the tonsils are to be removed.

On account of the prompt disappearance of the bacilli from the throat of this patient, it has occurred to me that the persistence of the germs in the throats of patients recovering from diphtheria is due to disease of the tonsils and adenoids. Diseased tonsil and adenoid crypts afford an ideal site for harboring infection. Experiments have shown how promptly virulent cultures are disposed of by the cilia and normal secretion of the nose. It is my belief also that a healthy naso-pharynx, and throat, devoid of lymphoid tissue is incapable of harboring infection, as the diphtheria bacilli. It is not impossible that the persistence of diphtheria bacilli in the nose after diphtheria, come from the crypts of the adenoid, or else they belong to a species of bacilli often found in the nose which resemble Klebs-Loeffler bacilli, both culturally and morphologically, but are not pathogenic.

803-804 Title Guarantee Building.

A NEW APPARATUS FOR THE ADMINISTRATION OF ETHER

BY MARY P. S. RUPERT, M. D., PHILADELPHIA.

The accompanying illustration shows a simple device for the administration of ether in operations about the mouth and face.

The apparatus consists of a glass bottle for ether which stands in a water bath. The bottle should be only half filled with ether, and the temperature of the water bath must be kept at 90-100 degrees.

The bottle is fitted with a rubber stopper, through which pass two metal tubes of different lengths. To the longer one is attached a hand-bulb, which is used to force the ether vapor out of the bottle,

through the short tube. A hollow metal retractor is connected with the short tube by means of rubber tubing, and through this the ether vapor is pumped into the mouth; or if preferred, through a pliable metal nasal tube into the nose. In this way an easy and even anesthesia may be maintained by fairly steady pressure on the hand-bulb and by keeping the water bath at the proper temperature in order to vaporize the ether.

It is best to induce anesthesia in the usual way—that is, by a close inhaler, or a mask—and after narcosis is produced, change to the vapor apparatus.

The advantages of the apparatus are obvious. It does away with all forms of masks or gauge cones, permitting an even and satisfactory anesthesia without any interference with the operator.

By a careful adaptation of the relative length and width of the metal tubes and the size of the hand bulb, it is practically impossible for liquid ether to be carried into the patient's nose or throat.

The apparatus is readily portable, easy to operate and safe in the hands of the average administrator. It has met with the approval of a number of the leading surgeons and has been exceedingly satisfactory in prolonged anesthesia for cleft palate work.

132 South Eighteenth Street.

Note on a Case of Fenestration of the Anterior Pillars of the Fauces. P. WATSON WILLIAMS. *Lancet*, Jan. 25, 1908.

The writer considers the condition congenital on account of:

(1) The absence of any cicatrices or unevenness in the margins of the fenestrae; (2) the bilateral symmetry of the malformation; (3) the arrangement of the strands of mucous membrane and the muscle fibres, and that they obviously correspond to the anterior pillars of the fauces; and (4) the fact although the posterior faucial pillars do not show fenestration, yet the palato-pharyngeus muscles are collected into a separate bundle of fibres on each side, with only a thin layer of mucous membrane in continuity with the lateral walls of the pharynx. Thus, in front the palato-glossus muscle forms a separate bundle, passing down to the tongue, and forms the inner boundary of a fenestra on each side, while the palato-pharyngeus forms the inner boundary of a thin web of mucous membrane.

A possible explanation of these fenestrations is that the condition of the anterior faucial pillar was similar to that shown in the posterior pillar until scarlatinal angina caused the thin web of mucous membrane to ulcerate, leaving the strands of palato-glossus muscle seen in later life. THOMSON.

AN IRRIGATING APPARATUS.

BY FRANK BRAWLEY, M. D., CHICAGO.

Feeling the need of a more convenient means of irrigating the nasal accessory sinuses, etc., I have arranged a simple apparatus which I feel is of sufficient value to present to this Society.

In the past we have been dependent upon the barrel-syringe, the gravity irrigator, bulb-syringe, etc. The same objections apply to all of these: the pressure is not fully and easily under control; the syringes require that one stop and refill them from a solution which must be prepared for each patient. The patient must be entrusted with the canula in irrigating accesory sinuses while the operator is refilling his syringe, and he frequently allows the instrument to slip from its position necessitating its replacement, which is often very difficult. To meet these objections I have adapted an

ordinary copper compressed air tank, (A), block tin lined, with a capacity of about two gallons. Compressed air from the supply furnished by the office building enters the tank (B) through one of the valves at the top and its force is expended against the surface of the contained solution. The solution escapes through a long tube (see dotted lines A) reaching nearly to the floor of the tank and connecting with the second valve placed opposite the first at the top of the tank. An ordinary compressed air tube and cut-off (D) are used to carry the solution where desired. The cut-off I have modified by extending the outlet tube to a length of 10 centimeters with a truncated cone tip (E), ground to fit the connections on my canulae. The hand and cut-off are protected by a bell-shaped shield from solution or secretions which might run backward along the canula. The solution is kept warm by a flat electric stove against the bottom of the tank. This stove has three degrees of heat, controlled by a lever which projects from a slot in the false bottom of the tank (A) A screw plug with lever handle (C) about 3 centimeters in diameter set in the top of the tank per-

*Read before the Chicago Larygological and Otological Society, February 11, 1908.

mits of refilling and cleansing. I use a physiological saline solution, as it is preferable in its solvent properties to the usual alkaline solution, and is easily and inexpensively prepared. The apparatus was made for me by Mr. Sickler of the W. R. Grady Co.

The illustration shows the form of canula used. Two sizes are made and as these are of coin silver as many as necessary may be bent into the various curves used to reach the different sinues and then varied slightly to suit the individual case.

72 Madison Street.

UNUSUAL TERMINATION OF A CASE OF ACUTE MASTOIDITIS.*

BY A. C. MAGRUDER, M. D., COLORADO SPRINGS, COLO.

At 7 p. m. May 6th I was asked by Dr. Perkins to see a scarlet fever case in which he suspected serious mastoid involvement. Grace L., age thirteen, had been ill three weeks with a mild form of scarlet fever. Four days before I saw her (on the seventeenth day of her scarlet fever illness), she complained of severe throbbing pain in left ear and headache. Dr. Perkins was called and, finding the mastoid tender and oedematous, called me. Examination of ear showed auricle and external auditory canal normal. The tympanic membrane was highly injected and bulging. There was exquisite tenderness over tip, antrum, and zygoma. Swelling extended over the entire mastoid area and zygoma. Temperature 102°, pulse 120. No history of chill. Pulse and temperature had been normal for several days prior to this acute onset of ear symptoms.

I advised immediate parecentesis, which was done under ethylchloride at 8 p. m. Free deep incision was made through mucous membrane down to the bone, and, aside from the average amount of hemorrhage, there was no other discharge. No serum. No pus. Ear was irrigated every six hours with hot alphozone solution. At 9 a. m. the next day, May 7th, temperature was 100°, pulse 100. Tenderness and swelling over mastoid very much less, and the patient reported having spent a very comfortable night, the best in four days. The drum membrane was much less injected; the paracentesis wound had closed; the throbbing pain, which had annoyed the patient, had disappeared; and there was but little headache. The hot irrigations of alphozone were continued every eight hours. May 8th, pulse and temperature practically normal, and all of the symptoms very much improved. May 9th pain in ear and head, and swelling over mastoid and zygoma had entirely disappeared; pulse and temperature normal; membrane normal. The child was allowed to get up. Ten days later, May 19th, there were no signs of mastoid swelling or tenderness, and the child was well. She would be out except for the scarlet fever quarantine.

I have never seen a case with more typical symptoms of middle ear and mastoid involvement. I have never before seen a case clear up so quickly—leaving no trace of the trouble. I presume the result is due to opportune drainage and large Eustachian tube.

305 North Tejon street.

*Read before the El Paso County Medical Society, Colorado Springs, Colorado.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, May 23, 1908.

WOLFF FREUDENTHAL, M. D. Chairman.

PRESENTATION OF PATIENTS.

At the opening of the meeting the secretary read a communication from the New York branch of the National Pharmacists' Association, inviting the Section to attend the meeting to be held in the city on May 28. It was moved and carried that the invitation be accepted.

Some Points Concerning the Surgical Principles Involved in the Treatment of Frontal Sinus Suppuration. By JOHN F. BARNHILL, M. D., Indianapolis.

To be published in full in a subsequent issue of THE LARYNGOSCOPE.

Frontal Sinus Diseases. PROF. ALBERT JANSEN, M. D., Berlin, Germany.

To be published in full in a subsequent issue of THE LARYNGOSCOPE.

DISCUSSION OF PAPERS OF DR. BARNHILL AND PROF. JANSEN.

DR. MYLES said that all surgeons love a bold operator, and the readers of the papers have merited our affection. After the papers read by Professors Killian and Jansen, there remained but little to be said in regard to frontal sinus technique. The only addition to the radicalism would be complete removal of the posterior superior bony walls of the sinus, which would allow the intracranial structures to join with the orbital fat in obliteration? In regard to the choice between the intra-nasal and the external methods of operation, his experince had led him to run the gamut in both directions. For a while he achieved the most satisfactory results by the external methods, and he kept these up until some predicament arose, individual and peculiar, which would cause him to resort more frequently to the internal method; then a limited number of failures in the internal method would necessitate a resort to the external operation. He believed that we should continue to devote a certain amount of special work to the intra-nasal method;

there is much yet to learn in this direction, but we are on the road to improvements in instrumentation and technique which will make it much safer, and increase the percentage of permanent cures.

It has been demonstrated in the sphenoidal cells and the antrum of Highmore that the so-called pathological processes in these sinuses are not necessarily so stubborn nor serious as they are usually considered. Very few ever curette thoroughly all of the pathological mucosa of the sphenoidal cells. Free drainage and ventilation will frequently secure remarkable cures.

DR. BERENS said that neither one of the distinguished guests had really defined whether he meant acute or chronic when he spoke of curing frontal sinus disease by the intra-nasal method, nor did he believe it was the custom of writers on this subject to do so. Every one sees many acute frontal sinus cases get well without operation, while other cases are cured by the removal of the anterior end of the middle turbinate; but we rarely see a complete cure of chronic frontal sinusitis by intra-nasal methods. It had not been his good fortune, at least, to secure complete cure of a frontal sinusitis of long standing by the intra-nasal method. The keynote to the absolute cure of a chronic frontal sinusitis is as Dr. Jansen and Dr. Barnhill had to-night expressed it—the complete removal of the disease around the basal part of the frontal sinus, all the diseased ethmoid cells and all of the ethmoid cells that can interfere with drainage from the operated frontal sinus. This necessarily often means the removal of a considerable part of the orbit, part of the ethmoid along the orbital plate of the frontal sinus. In no other way are we going to get a radical cure in these cases, excepting by resort to the open method mentioned by Dr. Barnhill, and quoted by Dr. Coakley. Even when dealing with such cases by the open method, if we leave diseased ethmoidal cells, the patients are not relieved of pain, the most trying of all their symptoms. He had seen much pain result from a diseased ethmoid cell overlooked during a frontal sinus operation that was healed by the open method.

Many acute cases get well without operation, many by mild intra-nasal methods, but he wished to register his protest against any attempt to drill through the nose into the frontal sinus. Recently Dr. Ingals of Chicago had read a paper advocating intra-nasal drilling with special instruments, but he wished to emphasize his protest against all such methods as being unsurgical, uncertain and dangerous. The keynote of success, whether it be by Jansen's

operation, Killian's operation, or Luc's operation, is complete drainage, and the complete removal of the ethmoid cells which interfere with this drainage.

Dr. Felix Cohn said that he could only voice the sentiments of the preceding speakers in giving expression to the pleasure derived from listening to the papers of Drs. Barnhill and Jansen. In regard to accessory sinus disease from a surgical standpoint, we are confronted with several problems. In the first place, the anatomical and topographical relations of the sinuses are such that with our present methods of operation it is almost impossible in all cases to thoroughly eradicate the affected parts, and this holds especially true for the posterior ethmoidal and sphenoidal sinuses. We have as yet no method, for instance, of thoroughly attacking the roof of the sphenoidal sinus, and yet the only case that the speaker had observed of fatal termination due to sphenoidal disease occurred in an adult of fifty, who died of fibrino-purulent meningitis, the meningitis having been due to extension from the carious roof of the sphenoid,—a similar case having been reported by Dr. H. Knapp, some years ago, in an adult of seventy.

Secondly, in accessory sinus disease, especially of the ethmoid and sphenoid, we know that fatal terminations are rather rare occurrences; a thorough eradication of the disease requires extensive, prolonged, and severe operative manipulation. As for frontal sinus disease, we must take into consideration the cosmetic result, for even a permanent cure, with a correspondingly poor cosmetic result which cannot always be avoided owing to the prevailing anatomical conditions, would, in many cases, irreparably injure the social standing and psychic life of the patient. A further elaboration is not necessary.

The consideration of procedures for maxillary antrum disease needs hardly to be dwelt upon, as most rhinologists are agreed as to the methods. For sphenoid and ethmoid disease we have to consider two distinct methods of operation, the intra-nasal and the maxilary route, the latter recommended and elaborated by Dr. Jansen. Both of these routes, or a combination of both routes can be recommended in selected cases. A great deal can be accomplished by intra-nasal methods, as already referred to by Dr. Myles. In the surgical consideration of frontal sinus disease, it is necessary, first of all, to determine what are the diseases of the frontal sinus which require operative interference, and what method of operation we should employ. All inflammations refera-

ble to dyscrasic conditions, tubercular, syphilitic growths, malignant or malign, mucocele,—all comparatively rare occurrences,—are absolute indications for operative interference, and for these conditions there is only *one* method, a thorough external operation, whether by means of an osteo-plastic resection, or a Killian, or a modified Killian operation; we have no choice, and every patient will willingly give his consent, no matter what external deformity may result. If we exclude those diseases in which the route of operation is self-evident, we have only the following remaining diseases:

I. *Acute Inflammation of the Sinus*:—It is our experience that most of these cases get well spontaneously, without any, or with minor intra-nasal procedures, such as removal of the middle turbinated, lavage of sinus, etc. It is surprising what severe forms of acute frontal sinusitis will recover. An external operation is therefore hardly necessary to consider.

II. *Chronic Frontal Sinusitis*:—Accompanied by caries, granulations in sinus, purulent conditions, or those chronic forms of frontal sinusitis occurring in atrophic rhinitis. For these conditions we must all agree with Drs. Barnhill and Berens that there can be only one route to pursue, and that is the external route, and for such cases we fortunately have an almost ideal method in the Killian operation. Fatal terminations in frontal sinus disease are extremely rare; it is therefore our duty to carefully select our cases for operation, and only operate when either the subjective symptoms of the patient absolutely demand operative interference, or our methods of examination warrant us in assuring our patients of a good cosmetic result. A small sinus invariably gives a better cosmetic result than a large sinus. If we bear these facts in mind we will naturally lessen our operative activity and have fewer opportunities to operate, but our results will be more satisfactory, and in the long run our patients will be more satisfied.

For chronic frontal sinusitis accompanied by atrophic rhinitis, only those should constitute operative indication where either a vital indication exists or the subjective symptoms of the patient are of such a grave nature that they themselves demand the operation; or, finally, if we cannot succeed in making our patients comfortable by symptomatic or slighter methods of procedure.

In regard to the technique, the speaker would prefer the closure of the external wound in all uncomplicated cases, and as often as possible with safety to the patient, rather than the open method

advocated by Dr. Barnhill. The cosmetic result is far more assured, and drainage—if the methods of Killian are strictly followed—is always sufficient to ensure a final cure.

DR. BARNHILL, closing the discussion, said that it should be the effort of the profession to get away from some of the beaten paths, and to study more closely the principles on which these operations are based. He is convinced that in some cases better and more certain results can be obtained by using a method where one can at all times see what is being done. The worst things concerning any plan of operation in which there is immediate closure of the wound is that from the time of closure one must work in the dark, and if anything goes wrong during the after treatment one is not able to correct it, and this is the cause of a certain amount of failure. He had dwelt upon the fractiousness of granulation tissue, and stated that any one who has had much experience with granulation knows that when a wound is once closed there is always much uncertainty as to the subsequent behavior of this class of tissue, and consequently much uncertainty as to the ultimate outcome of the case.

He agreed with Dr. Cohen in his agreement with what Dr. Berens had said. There are cases in which there is no successful plan of treatment except to get inside the sinus, clean it out, and then so manage the granulation tissue that obliteration of the cavity occurs.

PROF. JANSEN said that he held the same position as Dr. Barnhill, and that he agreed with Dr. Cohen, and with what Dr. Barnhill and Dr. Berens had said. He had simply described his method of operating. It was not his intention to say that this method should be employed in every case. Acute cases he almost never operates. Sometimes an operation from the inside is successful and effects a cure. Every kind of affection has its own indication for operation. He believes that he can always, or nearly always, remove the whole ethmoidal bone without danger to life; and if he understood correctly what Dr. Berens had said, he agrees with him, entering and removing the mucous membrane, and stopping on the bony plate.

When there are headaches after an operation, it is likely that some cells were not properly opened, or the sphenoidal cavity demanded more thorough treatment. He thinks that the headaches are the best indication for surgical treatment of the sphenoid sinus. He generally uses the cosmetic methods for operation, if he might be allowed to call them such. He believes in the open

treatment; it is always more effectual, but he finds that the treatment of open wounds is impossible without irrigation. All the gauze, powder, etc., which he brings in contact with the wound is made perfectly sterile, and then the wound is closed. We are not working in the darkness, but are working under better conditions of healing generally. Naturally, however, there are certain instances which require other methods.

DR. HARRIS moved that the thanks of the section be extended to its distinguished guests for their courtesy in coming from such a distance, and favoring the members with such national contributions.

The Use of Sodium Perborate in Laryngology and Otology. ARTHUR HARTMANN. *Deutsche Med. Wchnschr.*, Sept. 19, 1907.

Sodium Perborate (Merck) is a white powder which combines the properties of borax and hydrogen peroxide. In the presence of pus, oxygen is liberated and borax remains. The author speaks favorably of its use in appropriate cases. YANKAUER.

Note on the Removal of an Open Safety Pin in the Œsophagus of a Child aged Five Months. DONALD R. PATERSON. *Lancet*, Feb. 1, 1908.

Criticising the above communication, Dr. Peterson points out the great dangers of the method employed, although it ended fortunately. He pleads for the adoption of Killian's oesophagoscopic tube in any similar cases. THOMSON.

ERRATUM.—On page 592, seventh line, instead of *eight* read *over one hundred*.